A SHORT

HISTORICAL ACCOUNT
OF
LONDON-BRIDGE;

WITH
A Propoſition for a New STONE-BRIDGE
AT
WESTMINSTER.

5 Pl

AS ALSO
An Account of ſome Remarkable STONE-BRIDGES Abroad, and what the beſt Authors have ſaid and directed concerning the Methods of Building them. Illuſtrated with proper Cuts.

IN
A LETTER to the Right Honourable the Members of Parliament for the City and Liberty of WESTMINSTER.

By NICHOLAS HAWKSMOOR, Eſq;

K

Bid Harbours open, Publick Roads extend,
And Temples Worthier of the Gods aſcend;
Bid the Broad Arch the Dangerous Flood contain,
The Mole projected break the Roaring Main;
Back to his Bounds their Subject Sea command,
And roll obedient Rivers through the Land:
Theſe Honours, Peace to happy BRITAIN *brings;*
Theſe are Imperial Works, and worthy Kings.

POPE's Epiſt.

LONDON:
Printed for J. WILCOX, at *Virgil*'s Head, againſt the New Church in the *Strand*; and ſold by the Bookſellers of *London* and *Weſtminſter*. 1736.
(Price Three Shillings.)

11

MVSEVM
BRITAN
NICVM

To the Right Honourable

The Lord *SUNDON*,

One of the Lords Commiſſioners for executing the Office of Lord High Treaſurer of England;

AND

To the Right Honourable

Sir *CHARLES WAGER*, Kn^{t}.

Firſt Lord Commiſſioner for executing the Office of Lord High Admiral of England,

Repreſentatives in Parliament for the City and Liberty of Weſtminſter.

My Lords,

I Have the Honour to lay before You, ſome Thoughts upon a Subject, I am perſuaded, will be no ways unacceptable to be ſpoke of, to You, in particular, who are with general Voice of the People of the City and Liberty of *Weſtminſter*, ſent by them Their Repreſentatives in Parliament.

AND Whoſe Intereſt, from Your high Stations, known Humanity, Zeal for the Publick, and Candor to All, can never be neglected.

FOR which Reaſons, I preſume to addreſs myſelf to You, in Behalf of the Publick in general, and thoſe You repreſent in particular; and humbly offer to lay before You the following Obſervations, for Your Peruſal and Conſideration, for Erecting a Stone-bridge over the River *Thames* at *Weſtminſter*. I am, with the greateſt Duty and Regard,

My LORDS,

Your moſt obedient Servant,

Nich^s. Hawkſmoor.

A
Short Hiſtorical Account
OF
LONDON-BRIDGE,
WITH SOME
REMARKS and OBSERVATIONS
On the preſent State and Condition of it.

THE Riches, Honour, and Happineſs of a Kingdom, Common-wealth, or City, are the Reſult of good Regulations in all Branches of the Government; but more particularly in thoſe Branches which relate to * Commerce, Navigation, Manufactures, and Agriculture, and the Advancement of ſuch Arts, Sciences, and honourable Profeſſions, as tend to civilize and profit the Community; and while theſe prudent Maxims obtain'd, and were encourag'd by the ancient

---

[*] *Police* the *French* call it.

Greeks and *Romans*, thoſe Nations were at the height of their Grandeur and Reputation.

OF thoſe ſeveral uſeful Sciences, we ſhall at preſent only conſider that of Architecture and publick Buildings, and this no farther than it relates to the erecting Bridges of Stone, nothing conducing more to facilitate and promote the Trade and Proſperity of Towns or Cities than ſuch commodious Edifices for an eaſy and publick Acceſs.

WE ſhall, therefore, begin with ſome brief Remarks upon the original State of *London-Bridge*, and proceed to conſider the Propoſition now on Foot, for erecting a new one over the River *Thames*, from *Weſtminſter* to *Lambeth*.

MR. *Stow* obſerves from *Linſtead*, the laſt Prior of St. *Mary Saviour*'s, that there was no better Communication between *London* and *Southwark*, than a Ferry; which was undoubtedly (like moſt other Ferries) inſufficient for the carrying on the Buſineſs and Commerce of two ſuch populous and extenſive Places: the Citizens, however, were content with it, either thinking a Bridge would be too expenſive, or the Undertaking too difficult, or jealous (it may be) that if a Bridge ſhould be built, the Trade might be ſome ways diverted, and perhaps run into a new Channel.

THIS Ferry at laſt falling into the Hands of a Maiden Gentlewoman, ſhe built a Religious Houſe for Siſters, near the Church of St. *Mary Saviour*'s, and conſign'd over the Profits of it to their Uſe; but that Houſe of Siſters being afterwards converted into a College for Prieſts, and they reflecting upon the great Inconveniencies occaſioned to Paſſengers, by the many Lets and Hindrances of the Ferry, built, or procured to be built, a Bridge of Timber, and for a conſiderable Time kept it in Repair; till at laſt, from the great Expence of ſuch Repairs, and the many Interruptions of publick Buſineſs during the Reparations, it was reſolved to erect a new Bridge of Stone, which by the Aid and Aſſiſtance of ſome great Men, and Contribution of ſome Citizens (who were at laſt convinced of its great Conveniency and Advantage) was accordingly carried into execution, and accompliſhed.

THE Antiquity of the Wooden-bridge is not abſolutely certain; but *William* of *Malmesbury* ſays, it was ſtanding at the time when *Swayne*, King of *Denmark*, beſieged the City of *London*, *Anno* 994, and was in being in the time of King *Stephen*, *Anno* 1136; it was alſo repaired in the Year 1163.

THUS much ſays Mr. *Stow* of the Wooden-bridge, maintained for 215 Years, partly by the Revenues of its own Lands, partly by the liberal Benefaction of ſundry eminent and publick-ſpirited Perſons, and partly by the Aids of ſeveral intereſted and adjoining Counties.

IN the Year 1176, the Stone-bridge was begun, near to the Bridge of Timber, but ſomewhat more to the *Weſt*.

THE King * himſelf forwarded this great Work; and *Richard*, then Archbiſhop of *Canterbury*, gave one thouſand Marks towards carrying on the ſame; and in the Year 1209, it was compleatly finiſhed.

IT was undertaken, and vigorouſly carried on, by *Peter* of *Cole-church*, a Prieſt and Chaplain; and it is likely the Workmen were *Normans*, Maſons at that time being more numerous in *Normandy* than in *England*, which ſeems the more probable, becauſe *Caen* Stone, brought hither from *Normandy*, was much in uſe.

As to the laying the Foundation of it, Mr. *Stow* ſays, That the Courſe of the River was turned from *Batterſea* to *Rotherhith*; but whether this can be made appear, is not ſo certain. Many learned Hiſtorians have thought it but a Conjecture; nor is it altogether unlikely, but that the Canal, which was digged by *Swayne* King of *Denmark*, when he beſieged *London Anno* 994, and *Canutus* his Succeſſor, who opened the ſaid Canal on the like Occaſion *Anno* 1016, might lead Hiſtorians into that Opinion, that the River was turned.

---

* Henry II.

MANY ſkilful Perſons have thought, that the River *Thames* was not turned, but that the flowing of the Tides was then different, and that the Water did not riſe ſo high at the Bridge; for the *Thames* might heretofore over-flow the Marſhes near the Sea, and have a greater Spreading; which being now reſtrained by the Bank, called the *Wall of the Thames*, into narrower Limits, and the Water which comes from the Sea into the Mouth of the *Thames*, during the Flood, not being received by the Marſhes, muſt come up into the Country, and ſo ſwell the Tide higher at *London* than it uſually did.

THE celebrated Sir *Chriſtopher Wren* was of Opinion, that when the Foundation of *London-bridge* was laid, the Courſe of the *Thames* was not turned, but that every Pier was ſet upon Piles of Wood, which were drove as far as might be under low Water-mark, on which were laid Planks of Timber, and upon them the Foundation of the Stone Piers; the Heads of the ſaid Piles have been ſeen at a very low Ebb, and may be ſo ſtill, when ſome of the Chalk or Stone is removed to mend the Sterlings.

THE Narrowneſs and Inequality of the Arches, and the Largeneſs and Irregularity of the Piers are ſo great, as to make this a very ill-contrived Bridge: For the whole Breadth of the River from *North* to *South* is near 900 Feet; the Bridge containing twenty Arches, nineteen of which were open, and one filled up or obſcured. There are alſo eighteen

Solids or Piers of different Dimenſions, from thirty-four to twenty-five Feet thick; ſo that, according to this Diſpoſition, the greateſt Water-way is when the Tide is above the Sterlings, which is 450 Feet, and, conſidering the Impediments, it is not half the Width of the River for the Water to paſs; but when the Tide is fallen below the Sterlings, the Water-way is reduced to 194 Feet (which is during the greateſt Part of the Flux and Reflux of the Tide) and the River of 900 Feet broad is forced through a Channel of 194 Feet, which is not above a Quarter of the whole.

THE Gentlemen that projected this Bridge of *London*, which was both a great and laudable Undertaking, ought to to be remembered with Gratitude; but why they made the Arches ſo narrow, and the Piers ſo large, is not eaſily accounted for. But thus far one may juſtify *Peter* of *Cole-Church*, as to ſuppoſe he did not intend ſuch prodigious Sterlings, which have ſo much obſtructed the River's Paſſage betwixt the Stone Piers.

IT is very probable the Sterlings were made afterwards, to keep the Foundation of the Piers from being undermined, which might have been done, as has been experienced in other Countries, by laying a Border of large Stones down at the Feet of the Piers, which the *French* call *la Creche de la Pile du Pont*; or perhaps theſe Sterlings might be increaſed after ſome Damages that befell the Piers, by the great Quantity of Ice, which might be ſtopt by the Narrowneſs of the Arches; and thoſe that intended to make the Legs more ſecure, uſed ſuch Means as rendered them the leſs ſo, by the violent Rapidity which they gave to the River ſo reſtrained.

THERE is another Excuſe for *Peter* of *Cole-Church*, which ſeveral learned Gentlemen plead in his behalf, *viz.* that he deſigned, by the Narrowneſs of thoſe Arches, to reſtrain the

Ebbing of the Tide, the better to preſerve the Navigation of the River above the Bridge, tho' it would not have any great Effect, if the Sterlings were taken away. Some are of Opinion at this time, that if the River had its free Courſe, it would ebb away ſo faſt, that there wou'd be ſcarce any Navigation above the Bridge a little time after High Water.

THIS Allegation has no Weight with me, nor can I agree to it, being of *Scammozzi*'s Opinion, that all Bridges over great and navigable Rivers, eſpecially where the Tide ebbs and flows, ſhould have large Arches; and if the Arches of *London-bridge* had been wider, ſeveral skilful Perſons are of Opinion it had been better in general.

ONE may reaſonably ſuppoſe, that the Curators of the Bridge, being very careful, added thoſe large Sterlings, the better to preſerve the whole; which has changed the gentle Current of the *Thames* into many frightful Cataracts, which very much obſtructs and indangers the Navigation thro' the Bridge, as is often experienced, by the Loſs of Lives and Goods, and the Veſſels, which are either thrown upon the Sterlings, or ſunk within the Arches. It may be further remarked, that there are no convenient Stairs at the Ends of the Bridge, for the landing of thoſe who are ſo wiſe as to avoid the Danger of thoſe great Falls; and it is much to be feared, that the Foundations of the Piers muſt have receiv'd Damage, by ſuch violent Torrents paſſing thro' for the Courſe of ſo many Years.

WHAT relates to the upper Part of this Bridge may be ſaid in a few Words.

THAT the Breadth of it was formerly ſufficient for all Manner of Carriages and Paſſengers, appears from hence, that a Tilt and Tournament were held on it in the Year 1395; which plainly ſhews, it was free from Houſes for upwards of 200 Years; and how it came at laſt to be embarraſſed, or by what means that Nuſance of Building upon it has been conniv'd at, is ſurpriſing; for to erect a Bridge for a ſafe and open Paſſage, and afterwards to ſtreighten and incommode that Paſſage with Houſes, ſo as to make it difficult for two Carriages to paſs by one another, without endangering the Lives of Foot-paſſengers, or driving them into thoſe very Houſes for their Security, muſt be very abſurd, in that it perverts and deſtroys the principal Benefits that can accrue from a Bridge: And, indeed, it is wonderful how thoſe Buildings do ſubſiſt; for the Houſes ſtanding upon the extream Parts of the Pier-heads, the one half on the Bridge, and the other half hanging over in the Air, muſt certainly make the Backs of the Piers ſuffer much by that unequal Preſſure; and as for the Appearance of thoſe Houſes on either ſide of the Bridge, it is ſo diſagreeable, that it expoſes the Skill of the Projectors, and ſinks their Taſte down to the loweſt Barbarity.

BUT it is hoped, that the City of *London*, of ſuch mighty Commerce, and, in all other reſpects, managed with ſuch admirable *Police* (ſince it is now ſo much increaſed as to be eight Miles in Length, the Suburbs included) will not only not oppoſe, but readily promote another Bridge, for a better Communication of Trade, and Joint-advantage of both *London* and *Weſtminſter*; the only one they have at preſent, being ſo inconvenient and hazardous to paſs, either under or over it, by the Houſes above, and the Sterlings below.

BUT to conclude; what I have obſerved of the Inconveniencies of this old Bridge, and what I have ſaid concerning them, is not the Product of Malice or Ill-nature: If any one takes it ſo, they wrong me; for none can have a greater Regard and more hearty Wiſhes for the Proſperity of *London*, that fam'd Metropolis, and univerſal Emporium of *Europe*, than myſelf.

WHAT I am obliged to ſay, is rather with Concern than Envy; and I cannot help lamenting, when I obſerve that any thing, that ſhould be for the Uſe and Honour of this renowned City, does not riſe up equal to the Dignity of it, nor the Benefit of the Community.

TO offer at making a Propoſition for amending or leſſening ſome of the before-mentioned Inconveniencies at the old Bridge, is not my Affair at this time, nor have I any Direction on that Account; my Wiſhes are only for obtaining a new one at *Weſtminſter*.

BUT I will beg leave (without offending, I hope) to leave a *Memorandum* of what Thoughts have been had towards helping theſe Evils in the old Bridge.

I own the Sagacity of *Peter* of *Cole-Church*, for placing the Grand Pier in the Middle of *London-Bridge*; and, I am of Opinion, he did it for the Reaſons following, *viz.*

1ſt. TO be a Steadying for the whole Machine, inſtead of making an Angle, as it is in the famous Bridge at *Prague*, and in ſome of the Bridges in *France*.

SO this Fortreſs was placed in the Middle of the Bridge to ſtem the Violence of the Floods, Ice, and all other Accidents, that might be forced againſt it.

2dly. THAT if by any Accident of the Ice and Floods, or undermining any of the Legs, ſome of the Arches might fall, as five did *Anno* 1282. yet, by the Help of this great Buttreſs (though this Damage was done on one ſide) the Arches on the other ſide of the Buttreſs ſtood firm, ſo that there was leſs Expence, and greater Encouragement, to make the Reparation.

3dly. THE third Reaſon was, that he had an Opportunity to ſhew his Piety, having a Situation for erecting a Chapel, which was done, and his Body depoſited in it.

Memorandum. *This great Pier affords the Citizens of* London *a fair Aſſiſtance for amending their Bridge, and making the Navigation more eaſy and ſafe to preſerve the Lives, Goods, and Veſſels of many.*

ON the *North* ſide of this Pier, by taking away one Leg and two Arches next it, they may turn one Arch near 80 Feet ſpan.

AND on the *South* ſide of the ſaid Peer, and next to it, they may make another Arch of the ſame Span, or ſomewhat more. Theſe Arches would be about the breadth of the great Arch at *York*, which was placed in the ſtead of three leſſer ones, which always retarded the Floods, but this lets the Water paſs without Interruption.

THE reforming *London-bridge* would not be difficult or unreaſonably expenſive. I am not inſenſible of the Objections the Oppoſers will make; but as I have inſerted this, only as a *Memorandum*, I ſhall not urge it any further; though I beg leave to add, that I have heard ſome Maſters of Hoys and Lighters ſay, that a Tonnage would willingly be paid for ſuch a Conveniency and Security of their Goods and Veſſels; and *(as I have heard)* an Offer was made to pay Tonnage, if the Draw-bridge had been opened, when the City laſt repaired it, to avoid the Loſſes they ſuffered frequently by the Sterlings.

THESE Hints I have mentioned but tenderly, but they may not be unworthy their ſerious Conſiderations.

There is a Deſign annexed of this Scheme	*Pag.* 8. *Fig.* 2.
With the Arch at York	*Pag.* 8. *Fig.* 3.
And the Rialto at Venice	*Pag.* 8. *Fig.* 4.

A PRO-

A PROPOSITION

For Erecting A

BRIDGE at *WESTMINSTER*;

WITH

A Deſign of That and LONDON-BRIDGE *done upon the ſame Scale, and compared.*

WHILST the City of *London* was contained within its own Walls, and partly environ'd with a Ditch of Water, having the *Thames* on one ſide, and a great Lake on the other, in that Place which is now called *Moorfields* (as deſcribed by *Fitz Stephens*) it did not then ſeem probable that it would ever have ſwelled to this exorbitant Bigneſs.

At that time the Bridge of *London* was ſufficient, eſpecially as it was left by the firſt Builders, without the Inconveniencies which the Incroachments ſince made have ſubjected it to.

But as the Cities of *London* and *Weſtminſter*, &c. and their Suburbs, have been ſo enlarged, Neceſſity and Convenience calls for another Bridge, to expedite and forward the tranſacting of Buſineſs, and make it eaſy for Paſſengers, whether Citizens, Gentlemen, or others of the Country.

There is no need of ſaying any thing of the Badneſs and Inconveniency of *Lambeth-Ferry*, ſince there is ſcarce any one ignorant of it, and ſome have found it to their Coſt.

Instead of this Ferry, ſeveral worthy Gentlemen, for the Benefit of the Publick, are now endeavouring to obtain Leave of the Legiſlature to erect a Bridge of Stone, in ſuch Place and Manner, as the Parliament ſhall approve of, and empower them to do.

Some are for placing it at the *Horſe-Ferry*; others at *Charing-Croſs*: but if it was placed there, it would be too near the Elbow or Bend of the River. Therefore, if the *Horſe-Ferry* is too remote, it ſhould be put into ſome intermediate Situation, but by no means at the Bend of the River, becauſe both the ebbing and flowing Tides wou'd ſtrike obliquely againſt the Piers, and always be driving at the Bridge toward the *Weſtminſter* Shore. The Ice alſo in the Winter muſt have the ſame oblique Direction againſt the Bridge, and would injure the Foundation; and what did not paſs thro', wou'd be ſtop'd and accumulated in the Angles toward the ſaid Shore, where it would adhere and preſs them much, at every riſing and falling of the Water.

The River at the *Horſe-Ferry* has been examined, and is found to have a Bottom of hard Gravel. It is at Low-water eleven Feet deep in the Channel, and that but narrow; the reſt of the River is ſhallow.

THE Breadth is about 830 Feet from Houſe to Houſe, beſides ſloaping Banks; to anſwer which, a Scheme of a Bridge is here propos'd, according to the following Diſpoſition.

IT is propoſed to divide the ſame into nine Arches, two Abutments, and eight Piers, the Arches and Piers as followeth:

	Width. Feet.	Height. Feet.
The Middle Arch	100	50
The two Arches adjoining, are each	88	44
The two next, are each	76	38
The next following, are each	64	32
The two laſt Arches, are each	52	26
The two dry Arches under the Abutments, are each	25	

From the Spring to the Crown.

THE Piers in the Naked, excluſive of their Plinths, are as follows:

THE two great Piers that ſupport the middle Arch are twenty-five Feet thick, all the others being twenty Feet each.

THE two Abutments thirty-nine Feet each, beſides the outward Abutments of the dry Arches.

THE Bridge, from the bottom of the River to the top of the Parapet will be in the middle Arch near ſeventy Feet high, and the Breadth at top betwixt the Parapets, is fifty-four Feet.

BY this Diſpoſition of Piers and Arches, there will always be, during the whole time of Flux and Reflux, 660 Feet Water-way, and the Piers 170 Feet, which take up a fifth part of the River; ſo that this can occaſion no Damage by hurting the Navigation, or any Impediment to the Flux or Reflux of the Sea, worth Conſideration. Theſe are the Dimenſions of the propos'd Bridge.

WHAT Effect this will have upon the Flux and Reflux of the Tide, and alſo upon the Navigation, has been calculated by Mr. *Charles de Labelye*; and his Calculation, with the large Allowances he has made, and the Principles on which it is founded, have been approved by the beſt Judges. The Subſtance of which is as follows.

The Reſult of a Calculation made to eſtimate the Fall of the Water at the intended Bridge at Weſtminſter, *and ſome Conjectures of the Effects it will probably have on the Navigation of the River* Thames. *By* Charles de Labelye.

‘THE Fall may be ſuppoſed to proceed from the two following Cauſes: The Room occupied in the River by the Solidity of the Piers, and the Retardation which theſe Piers will occaſion to the Deſcent of the Waters at the time of Ebb.

‘THE firſt of theſe two Cauſes (which is the only one that has been conſidered hitherto) upon calculating the Solidity of thoſe Piers, according to their Dimenſions in Mr. *Hawkſmoor's* Draughts, and finding upon what Surface that Overplus of Water muſt be thrown, it appears, that it will never occaſion any ſenſible Fall, ſince it amounts to leſs than one quarter of an Inch. The other Cauſe of the Fall is much more conſiderable. This Calculation of it is founded upon the Doctrine of Falling Bodies, the Principles of Hydroſtatics, a great number of Obſervations made in ſeveral Streams by the Reverend Dr. *J. T. Deſaguliers*, ſeveral Obſervations made laſt Year on the greateſt Velocity of the Stream near the Place intended for the Bridge, the greateſt Riſe of the Tide in the ſame Place, and laſtly, by a true and exact Section of the River, obtained by three actual Menſurations of the Breadth of the

‘ River, and ſeveral Boreings, in order to produce from ‘ thence a juſt Eſtimate of the Quantity of Water paſſing ‘ through at any time. Moreover, to obviate or remove all ‘ Difficulties and Objections, and to have the utmoſt Fall, ‘ this Calculation ſuppoſes the Velocity of the Water, when ‘ greateſt, to be almoſt the double of what really it is, ‘ and the Tide is alſo ſuppoſed to riſe half as high again as ‘ it has been obſerved in the Spring-tides; yet, notwith‘ſtanding theſe Allowances, the Fall occaſioned by the Re‘tardation of the Piers to the ebbing Waters, will never a‘mount to more than four Inches, and ſeven 10ths of an ‘ Inch.

‘ THIS Fall of four Inches and ſeven 10ths, with the o‘ther occaſioned by the Solidity of the Piers, which we ‘ mentioned firſt to be about one quarter of an Inch, will ‘ make the whole Fall, when greateſt, never to exceed five ‘ Inches; which is ſo inconſiderable, that it will never ‘ hinder any Veſſel or Boat from rowing through, even a‘gainſt the ſwifteſt Tides.

‘ THE Truth of this Calculation (how ſurprizing ſoever ‘ the Reſult of it may appear to ſome People) receives a ‘ collateral Proof from this: That the ſame Principles and ‘ Methods of Calculation, being try’d in relation to the ‘ Paſſage left free for the Current of the Water at *London‘bridge*, and the Velocity of the Stream under thoſe Arches, ‘ the Reſult *(of the Calculation)* gives for the Fall at ‘ *London-bridge*, when greateſt, very near the ſame Number ‘ of Feet and Inches, as we obſerve it in Fact when at ‘ the largeſt Fall.

'As to what Effect this new Bridge will have upon 'the Navigation, I believe thoſe that are acquainted with 'the Nature of Tides, and the Currents of Waters, will 'allow the following Conjectures to be the moſt probable 'ones that can be form'd at preſent.

'Notwithstanding it is obſerved, that the upper Sur'face of the Water has a greater Velocity at ſome times of 'the Flood than at any time of the Ebb, I conceive there 'will be no ſenſible Fall at the intended Bridge during the 'Flood; neither will the Tide run ſenſibly higher between 'the two Bridges, ſo as to affect the Lands or Buildings on 'either ſide, on account of one Stream meeting the other, 'with little or no Obſtruction, conſidering the wideneſs of 'the Arches, and how few they are in Number; however, 'there will be ſome ſmall Ripplings immediately after the 'Water has paſs'd through on either ſide, but without any 'danger of Impediment to the Navigation.

'If *London-bridge* made no Retardation to the Deſcent of 'the ebbing Waters, not only there would be no Fall there, 'but the Tide of Ebb would not be ſo much the longer 'than the Tide of Flood, as we obſerve it is now; which 'being applicable (though in a much leſs degree) to the in'tended Bridge, muſt occaſion a ſmall, but not altogether 'inſenſible Change in the Duration of the Flood and Ebb, 'both above the new Bridge and below it, between that and '*London-bridge*.

'These I propoſe only as probable Conjectures, and leave 'them as ſuch. As to the Calculation of the Fall, I have 'deduced it from the trueſt Principles, and from the beſt 'Obſervations I have been able to procure, or to make 'myſelf

‘ THIS Problem is of a very complicated Nature; what I ‘ have done towards a compleat and adequate Solution of it, ‘ being only to comply with the Commands of thoſe Gen‘ tlemen, who honoured me ſo far as to deſire me to at‘ tempt a Calculation of the Fall.

N. B. *The Calculation at large, and the Original Numbers and Obſervations on which it is founded, are ready to be ſhewn to any Perſon who ſhall deſire it, and thinks himſelf ſufficiently acquainted with pure and mixt Mathematicks.*

THIS Calculation is approved of by the Rev. Dr. *Deſaguliers*, and others.

THAT which gives us fairer Hopes of living to ſee a Bridge built over the River *Thames* at *Weſtminſter* (a Benefit long wiſhed for by all) is, that we are bleſſed with a Prince upon the Throne of moſt Generous, Noble, and Princely Qualifications, a Lover of Mankind, of great Clemency, ever Studious of his Subjects Good and Proſperity, a great Encourager of Arts and Sciences, a Prince who juſtly may be ſtiled, *The Father of his People.*

THE ſeveral publick Buildings advanced by him, teſtify the great Pleaſure he has in magnificent and uſeful Works; and a Bridge of Stone built over the *Thames* in his Reign, for the Good of his People, will be (among his other Glories) an everlaſting Trophy to his Honour and Memory in times to come.

AN
ACCOUNT
Of ſome REMARKABLE
STONE BRIDGES in other COUNTRIES,
AND
What the Beſt AUTHORS have ſaid concerning them.

TO give a better Encouragement to this grand Undertaking, it may not be amiſs to mention what Works of the ſame kind have been done by other Nations.

ITALY being eſteem'd the Seat of Arts, as it was the Seat of Empire, we (in Juſtice to her) will firſt make ſome ſhort Remarks on what the *Italian* Authors have ſaid concerning the Subject we are now upon, and alſo take a ſhort Review of ſome of the Works which are there to be found.

THE learned Artiſts have offered Deſigns of Bridges, eſpecially the renowned *Palladio*; but they are rather Models, than Works of any great Span, being over ſmall Rivers, compared with the *Thames*: but as his Propoſals are well conſider'd, and the Deſigns beautiful, we ſhall give an Extract of what he has ſaid.

AFTER having firſt mentioned ſome gigantick Bridges, as that of *Caligula* and *Trajan*, &c. he relates what Bridges were over the *Tyber* at *Rome* anciently, and what are ſtill remaining at this Day; alſo touching ſome others in *Italy*.

The Bridges *over the* TYBER *at* Rome.

The Old Bridges.	Now remaining, and called.
Pons Ælius	*Pont St. Angelo.*
Pons Triumphalis	Now ruined.
Pons Janiculenſis	*Ponte Siſto.*
Pons Ceſtius	*Pont San Bartholomeo.*
Pons Frabricius	*Pont Caſpi, or Quatro Capii.*
Pons Senatorius	*Sancta Maria.*
Pons Sublicius	Ruined.
Pons Milvius	*Ponte Molle.*

HE does not mention what Number of Arches might be contained in each Bridge, or give any Dimenſions of them; there were about five Arches in each Bridge.

HE ſays, the *Triumphal Bridge* was very magnificently built, (as were moſt of the others) and much adorn'd with Statues and Ornaments, as the Bridge St. *Angelo* is at preſent.

1*ſt*. THE Bridge St. *Maria* is thus proportion'd at *Rome:* The Piers one third of the Opening; the Arches ſemicircular.

2*dly*. THE *Triumphal Bridge* has the Piers one half of the Arch, and the Arches are ſemicircular.

3*dly*. THE ſame Proportion has that now called *Quatro Capi*.

THE next Bridge ſpoken of by *Palladio* is the Bridge of *Rimini*, or *Ariminum*, ſaid to be built by *Auguſtus Cæſar*. It is really commendable, and moſt worthy Obſervation, for Strength and Beauty. It is divided into five Arches, the middle Ones are each twenty-five Feet, and the two others next the Banks are twenty Feet wide each; all the Arches are ſemicircular, and the Piers about half the Opening.

THE Becs, or Saliant Angles, are right Angles. There are Niches or Tabernacles on the ſides of the Bridge, very agreeable. Alſo a Cornice is continued the Length of the Work, the whole being exceeding beautiful.

HIS Deſign of the Bridge over the *Bachilione*, at *Vicenza*, hath three Arches; the middle one thirty Feet wide, and the other two are twenty-two Feet and half each: they are Segments, or Parts of a Circle, and the *Plumb* is one third leſs than the *Radius*.

THE Piers are one fifth of the great Arch, *viz.* ſix Feet wide or thick; the Legs are fifteen Feet high to the Impoſt. The *Bandeau* is one ſixth part of the leſſer Arch.

THE Bridge of the *Rezonne* at *Vicenza* hath three Arches. This is much in the ſame form as that over the *Bachilione*, and thus divided; the middle Arch twenty-nine Feet, the two ſide ones twenty-five Feet each, the Piers one fifth of the Opening.

HE gives a Propoſition for a Bridge, being a Deſign of his own, and very fine and beautiful, in the ruſtick Style. It is divided into three Arches, the middle one ſixty Feet wide, and the two ſide ones each forty-eight Feet wide. The Arches are Segments, or Portions of Circles; the Piers are twelve Feet thick, being one fifth of the Arch, and the Impoſt ſufficiently above any Floods that can come, crown'd with a beautiful Cornice and Parapet. From the Impoſt to the Crown of the Vault is ſixteen Feet high; the Bandeau, or Archivault, is one tenth of the Arch. It is alſo adorn'd with Niches and Statues.

THAT Deſign of *Palladio*, Lib. 3. *Cap.* 13. of three Arches, is of moſt admirable Beauty, Strength, and Conveniency; but it is moſt adapted for a mercantile City, where the Rivers are moderate and governable, and where there are few Wheel-carriages.

IT is adorned with Porticoes, Logias, and Colonades, covered over on each ſide, and accommodated for the Reception of a Concourſe of People, like a *Forum* or *Exchange*.

THE Arches over the Canal are ſemicircular; the Piers are one third of the Width of the Arch, and the *Bandeau*, or Arch-ſtones one tenth. This was deſigned for the moſt populous Trading City in *Italy*.

AND ſuch a Fabrick might be fitted to a River like that at *Briſtol*, and would bring Profit, Convenience, Ornament, and Honour, to ſuch a wealthy and noble City.

HIS Deſigns of Wooden Bridges are moſt ingenious and uſeful; but as we are engaged for thoſe of Stone, we need not offer Remarks on the other ſort.

AND this is all we need mention concerning what *Palladio* ſays of the Structures of Stone-Bridges. Theſe Specimens or Examples here inſtanced will aſſiſt us in greater Works of this Nature, which, like all other Edifices, ſhould be convenient, beautiful, and durable.

Some ſhort Obſervations on laying FOUNDATIONS, *by* PALLADIO.

WHAT *Palladio* ſays touching Founding thoſe Fabricks, cannot be brought as general Rules, without ſome Exceptions. He directs that,

1*ſt*, THE Abutments of Bridges next the Banks ſhould be built moſt firm and ſolid, becauſe they hold in the whole Series of Arches from ſpreading; and if the Banks are not of ſolid Foundations, they muſt be made ſo by Art.

2*dly*, THAT the Number of Piers ſhould be equal, that there may be an open Arch in the Middle.

3*dly*, THAT if the Bottom of the River is Stone-Gravel, or ſoft Stone, the Foundations are partly made; but if the Bottom is Sand or Gravel, then the ſame muſt be piled and plank'd, to reach the firmer Ground.

4*thly*, THE Way he propoſes to lay the Foundation is with Coffer-dams; one Leg to be built after another, and then the Arches to be turned.

5*thly*, THAT the Thickneſs of the Piers ought not to be leſs than a fifth Part of the Arch, nor more than one fourth of the breadth; that they ought to be made with large Stones, well cramped and tied with Iron.

6*thly*, THAT the Becks or Spurs ought to be made in right Angles; the Arches made very ſtrong, and large Somering or Vault Stones, well bound and cramped, to bear any Weight of Carriages that may come on them.

7thly, THAT the ſemicircular Arch is the ſtrongeſt and moſt beautiful, and that they muſt be pav'd at the Top with convenient Foot-ways.

8thly, THAT the Bridges ought to be placed where they may be of moſt Conveniency to the Inhabitants, and on the ſoundeſt and ſhalloweſt Part of the River, but by no means next the Bend or Elbow of it.

A SHORT
ACCOUNT
Of ſome more
FOREIGN BRIDGES, *and their* DIMENSIONS,
AND
The Opinion of ſome of the Beſt AUTHORS Continu'd.

S*CAMMOZZI* has treated much of Bridges, and touching the laying of their Foundations in divers Situations.

He generally recommends Piling, as the ſafeſt Way for the Foundation. He ſays, he laid two Deſigns before the

Senate at *Venice* for the *Pont Rialto*, one of three Arches, and the other conſiſting of one large Arch, which he propoſed to lay over the great Canal with Piles of Timber drove into the Ground, then with Net-work of Timber upon them, and Planks of Oak upon the Net-work, on which the Stone-work was to riſe.

HE propoſed to build that famous Arch, but it is allowed that *Michael Angelo* built it in the Year 1591.

HE ſays much about Pileing Foundations in many great Buildings; as the Tower in the Piazza St. *Mark* is thirty-ſeven Feet ſquare, and three hundred thirty-nine Feet high, ſtanding all upon Piles, and this is a preſſing Weight, but ſtands firm.

IN the ſame manner ſtand all the publick Buildings in *Venice*; and if Timber Piles, when they are always under Water, are not unperiſhable, the City of *Amſterdam*, with its Stadt-houſe, as well as all the publick Buildings of *Venice*, and the City itſelf, are but in a bad Situation.

WE muſt not omit mentioning the wonderful Bridge of *Trajan* over the *Danube*; if Authors don't miſtake, it was a ſtupendous piece of Work.

The Number of Arches were 20.

They ſay, the Height was 150 *Feet.*

The Width of each Arch was 150 *Feet from Pier to Pier.*

Some ſay, 170 *Feet.*

THE Thickneſs of the Piers is fifty Feet, ſome ſay ſixty Feet; ſo that by this Reckoning, the River was 4600 Feet, or ſeven Furlongs, which is more than four times the Length of *London-bridge*.

THIS was a ſurpriſing Undertaking, and indeed what the *Romans* themſelves were aſtoniſhed at, as appears by the ranting Inſcription they put on it when finiſhed. *

THEIR Policy was alſo as ſurpriſing as the Work, *viz.* that this expenſive Undertaking ſhould be performed by *Trajan*, and demoliſhed by *Adrian*, the next ſucceeding Emperor.

ONE would be glad to know by what Method they laid the Foundation in ſo large a River, and of ſo deep a Channel that hath ſo many Rivers to pour into, it and keep up its Flood.

SCAMMOZZI has laid down a Scheme, which he ſuppoſes they might go by, but it is only a Conjecture, and whether he is in the right, is not eaſily proved.

HE offers four ways of laying Foundations in deep and large Rivers.

1*ſt.* To ſhut up the River in Parts on one ſide, and then on the other, by driving a double row of Piles fill'd in with good Chalk, or ſome cloſe Materials, then to pump out the Water from the incloſed part, and clear out the

---

* Providentia Auguſti vere Pontificis (virtus Romana quid non domat?) ſub jugo ecce Rapidus & Danubius.

Mud; after that, to Pile the Foundation to the Extent of the intended Pier, and then to begin your Foundation of Stone upon a Platform of Planks. Thus did the Antients; but we muſt ſuppoſe it different, if it was not in ſhallow Rivers.

N. B. *This is no other than what we do by Coffer-Dams, made of Timber and Boards, and is what the* French *call* Batterdeaux.

2dly, THE Way is by ſounding the River, levelling the Floor, and preparing a Grillage of Oak, ſtrong, well pinn'd, and bound faſt together with Iron, and kept upon the Surface of the Water by large Hulks or Lighters, with Cables and other Machines, having a thick Stratum of large Stones laid on this Frame of Timber, the Stones being well cramp'd together, and the Joints filled with ſtrong *Padua* Lime, Mortar, *Puzzoli* Terrace, or Cement, and then letting them down gently to the Bed of the River, by proper Machines and Cables.

THIS was practis'd at the Port of *Oſtia*, in the Time of *Claudius*.

AND *Dragnet Reys* did the ſame at *Conſtantinople*, at the ſtately Moſque he built in the Sea.

3dly, HIS Method was in turning off the River another Way, or making ſeveral Channels to ſink the Water; then with Numbers of Workmen to make a Dam with Piles, above and below where the Bridge is to ſtand, quite croſs the River, and ſo turn the Stream into the new Channel, then to clear the Earth and Mud away, where the Foundation of the Bridge muſt be laid, and to bring the Piers above the Water; after this, to let the Water return into its old Channel.

4thly, HE believes that *Trajan* muſt needs make uſe of the following Manner, in building that Bridge over the *Danube*, viz.

To take an Elbow or Bend of the River, where it made a Peninſula, as the *Thames* in ſome Places does (and ſundry other Rivers do the ſame) to cut out a direct Canal thro' the Neck of Ground or Iſthmus, then to build the Bridge with Eaſe, and upon dry Ground; and afterwards to open the Paſſage thro' the Ground left at each End of this new Bed or Channel, whilſt the Bridge is building; then turn the River thro' it, being a more direct Courſe, making ſtrong Dams on the old bent Channel, to divert the Stream from its former Courſe. If it was performed ſo, it was a Work fit only for a *Roman* Emperor and a *Roman* Army to perform.

SEBASTIAN SERLIO mentions the Proportions of the four principal Bridges at *Rome*.

1ſt, OF *Pont Siſto* he ſays, the Piers are one third of the Opening, and the Arch ſemicircular; the *Bandeaux* of the Arch one half, and the Cornice one fifth of the Arch.

2dly, OF *Pont St. Angelo*, the Arch is ſemicircular, the Piers one half the Aperture, the *Bandeau* is one ninth of the Diameter of the Arch.

3dly, OF *Pont di quatro Capi*, the Arches are ſemicircular, and has a large Pier (as in three old remaining Arches,

Arches this Bridge joins the Iſland to the City) which Pier is as broad as the Arch is wide, the other half the Width of the Arch.

4*thly*, OF *Pont Molle*, the Arches are ſemicircular; the thickneſs of the Piers half the Aperture; the thickneſs of the Arch-ſtones is one tenth of the Diameter of the Arch; the Becs are ſemi-circular, and there are Niches on the Piers.

The RIALTO *at* VENICE

IS that Maſter-piece of Art, allowed to be built by *Michael Angelo*, *Anno* 1591, over the great Canal of that City. It is true, there is not much of the Tide, nor much Current of the Water; however, it is eſteemed a bold and noble Undertaking.

DOUBTLESS this huge Machine is rais'd on Piles, as the whole City is, the Church of St. *Mark*, St. *George*, and all the publick Buildings.

THE Arch is a Segment of a Circle; the Span is eſteemed 98 Feet and an half *Engliſh*; and the Plumb to the Crown of the Arch from the Water is about twenty-three feet. This Bridge is much celebrated.

THERE is alſo an antique Bridge at *Verona*, with large Arches.

An Extract relating to ſome BRIDGES *in* FRANCE.

THERE are many magnificent Bridges in *France*, and ſome lately rebuilt, and they being very extraordinary, and of large Spans, and over broad Rivers, they will ſuit our Purpoſe beſt: And as Mr. *Gautier* has taken a great deal of Pains about them, we muſt make uſe of his Account for our better Information.

THE *Pont Royal* at *Paris* was built *Anno* 1685. He ſays, it was directed by Mr. *Manſart*; but it appears by the Drawings of Mr. *Romaine*, a Dominican Fryar, that he had the managing of the Work.

THE River is about half the Breadth of the *Thames* at *London*. This Bridge is built with Stone over the *Seine* at *Paris*, over againſt the grand Pavilion of the *Thuilleries*, and was made purſuant to the Plan order'd by the King. The length of the Bridge is four hundred twenty-ſix Feet *Engliſh* from one Kay to the other, and the Parts of it are as followeth:

TWO Abutments next the Banks, four Piers, and five Arches. The thickneſs of the Piles or Piers are fifteen Feet *Engliſh* in the Naked, and fifty one Feet eight Inches long in the ſquare Parts; and the Pier-heads are advanced fifteen Feet at each end of the Piers, terminating in right Angles at their Points.

THE ſaid Piers, at a level with the top of the Water from the Foundation or Bed, have a larger thickneſs for the ſet off, which makes the Plinths or parts in the Water ſixteen or ſeventeen Feet *Engliſh* in thickneſs.

THE five Arches are in their Span as followeth, *viz.*

The Middle Arch is ſeventy-ſeven Feet wide in the Clear.

The Arches on each ſide are ſeventy-four Feet Engliſh *in the Clear.*

The two Arches next the Abutments are ſixty-eight Feet and half Engliſh *in the Clear.*

The Height of the ſaid Grand Arch, being Eliptical, is from the Springing to the Crown or Key, twenty-ſix Feet Engliſh.

THE other four Arches are Eliptical, and riſe in proportion to their Span from the Key to the Springing, which gives the Bridge a gradual Pent.

THE Breadth of the Bridge in the Middle for Coaches and Horſemen, is thirty-two Feet and half *Engliſh* wide, and the Foot-ways on each ſide nine Feet nine Inches *Engliſh* wide, poſted in with Stone, and all well pav'd.

THE Parapets on each ſide the Foot-way, are two Feet thick, and well cop'd, and in Height three Feet, three Inches.

HE then proceeds to the Particulars of Materials and Works, &c.

AND erects this famous Fabrick in the River, the general Depth ſeven Feet *Engliſh*, by the Help of Batterdeaux, or, as we call them, Coffer-dams, placing all the Piers upon Piles of Oak Timber, which Piers are guarded at the Bottom by what they call *Creche de la pile du Pont*, inſtead of Sterling, which is a Border of great Stones, well cramp'd, and laid three Feet below the Bed of the River.

THIS Extract may be ſufficient for our purpoſe at this time, in regard to this Bridge.

THE Bridge at *Blois* over the *Loire* will come neareſt to our Affair, the River being broad, and in conſequence the Bridge long; built by Order of *Lewis* the 14th, after the Plan of the Sieur *Gabriel*.

THE ſaid Bridge is about 932 Foot *Engliſh* long from one Quay to the other, conſiſting of two Abutments on the Banks or Quays. It has ten Piers and eleven Arches.

THE Abutments ſally or project ſix Feet from the Quay (Kay) and in thickneſs thirty-nine Feet *Engliſh*, all the breadth of the ſaid Bridge, and riſe from the loweſt Water almoſt twenty-four Feet.

THE two Piers of the grand Arch each ſeventeen Feet and half.

THE Piers that ſuſtain the two Arches on each ſide the grand Arch in the middle, are twenty-two Feet ſix Inches each in thickneſs, and the ſix others are ſixteen Feet three Inches each in thickneſs.

THE length of the ſaid Piers are forty-nine Feet *Engliſh*; their ſaliant Angles, or Points ending at right Angles, being advanced 16 Feet *Engliſh* towards the Stream, and ten Feet ten Inches at the other End.

The eleven Arches are in Span as follows:

	Ft.	Inch.
The Great Arch	86.	09.
The two next on each ſide	80.	
	80.	
The two next Ditto	73.	
	73.	
The two next Ditto	66.	
	66.	
The two next	60.	
	60.	
The two laſt next the Shore	55.	04.
	55.	04.
Water-way	755.	05.

Solids.

	Ft.	Inch.
The great Piers each	22.	06.
	22.	06.
Two Piers, each	17.	02.
	17.	02.
The otherSix, each 16 *ft.* 1 *in.*	96.	06.
Piers	175.	10.
Open.	755.	05.
	931.	03.
The Abutments	60.	00.
	991.	03.

The height of the grand middle Arch is, from the Surface of the loweſt Water to the under-ſide of the Key-ſtone of the Vault of the ſaid Arch, thirty-ſix Feet ten Inches *Engliſh*.

The ten other Arches are lower'd with a proportionable Pent from the middle of the Bridge to the Entrance.

The breadth is forty-five Feet ſix Inches between the Walls of the Parapets, the whole length of the Bridge; the thickneſs of the Parapet Wall is two Feet two Inches, to make the ſaid breadth forty-nine Feet ten Inches.

The Road for Coaches and Carriages is thirty Feet wide between the two Banquets or Foot-ways, which are ſeven Feet ſeven Inches wide each, and rais'd about a Foot above the Pavement of the Coach-way.

The Walls of the Keys on each ſide the new Bridge next the City, and on the other ſide next the Suburbs of *Vienna*, were new built, and extended in length conſiderably all thro' the Work in a magnificent manner, being built with large Stone.

The Foundation and Piers of this vaſt Machine ſtand upon Oak Piles, and the Water of the River was kept off by help of Coffer-dams, or, as they call them, Batterdeaux, during the time of bringing the Piers above the Level of the Water.

This Bridge is well pav'd on the Coach and Foot-ways, and on each ſide guarded with Stone.

There

There are other Eminent BRIDGES *in* FRANCE; *viz.*

THE Bridge at *Avignon*, built with Stone, and divided into eighteen Arches. The Length of the whole Bridge is, by Eſtimation, 500 Toiſe of 3000 Feet *French*. The Arches were very large; but there certainly is an Iſland, that divides the Stream, or this is a vaſt Length for the eighteen Arches. It was begun *Anno* 1176, and finiſhed in the Year 1188; ſo it was twelve Years in building.

PART of the Bridge was broke down in the Diſpute between *Benedict* and *Boniface* *, *Anno* 1385, and continued neglected till the Year 1670; and then by the Violence of the Froſt and Ice, more of the Arches fell down. There ſtill remains the Pier with the Chapel of St. *Nicholas* upon it, on that Side next the City.

THE Bridge of St. *Eſprit*, is of a more magnificent Taſte than that of *Avignon*, and much celebrated; it is divided into nineteen Arches, and ſeven ſmall ones.

SOME of the Arches are upwards of 120 Foot in the Span or Width from Pier to Pier; and the whole Length of this Bridge is computed at 2600 Feet.

---

* Two Popes.

THE Bridge at *Lions* is diſpoſed into twenty Arches; ſome of them very large, Authors ſay, upwards of ninety Foot.

THE *Pont du Guard* is an amazing Structure, built by the Ancients; the Piers are but thirteen Feet thick, and ſupport an immenſe Weight of a triplicated Arcade.

SOME of the lower Apertures are 60 Feet wide, and the Height is 150 Feet.

THERE are other remarkable Bridges; but it is not neceſſary to carry this Account any farther.

An ACCOUNT *of ſome* BRIDGES *of Note in* ENGLAND.

THE Bridge of *London* I have related already, to which I refer; and alſo to the Plans and Elevations hereto annexed.

THE Bridge at *Rocheſter* is built much in the ſame Style with that at *London*, only that it may be eſteemed a better in ſome Reſpects.

1ſt, THAT no Houſes are placed upon it, to make it uſeleſs.

2dly, THE Arches are wider than at *London* Bridge.

3dly, IT ſpans a noble and deep River, 550 Feet wide, and is diſpoſed into eleven Arches; the wideſt is more than forty Feet, moſt of them above thirty Feet wide.

THE greateſt Water-way is 340 Foot, and ten Piers make 190 Feet at low Water; the Sterlings take up ſo much of the Courſe, that there is left but 230 Feet for the Tide of Flood and Ebb to act in.

THE Foundation of this Bridge muſt be upon Piles; and the laying the Foundation of this Fabrick in ſo deep a River, where there is ſo large a Flow of the Sea, was no ſmall Undertaking.

THERE are ſeveral Stone Bridges over the *Severn*, of large Extent; *viz. Glouceſter*, *Worceſter*, *Shrewsbury*, *Bridgenorth*, and others.

THAT at *Briſtol* over the *Avon*, is a handſome Stone-Bridge; and though the River is not broad, yet it is very deep, and the Tide riſes very high, ſo that it muſt needs have been a difficult Piece of Work to lay the Foundation.

THE Stone-Bridges upon the *Trent* are not many; that at *Nottingham*, and that at *Burton*, are the moſt conſiderable; the laſt has thirty Arches.

THE Tower at *Boſton* in the Fens of *Lincoln* is an admirable Piece of Maſonry, riſing near 300 Foot on a ſmall Baſe, conſidering its Height: I mention it, becauſe it can have no other Foundation than Piles of Wood to bear ſuch an immenſe Preſſure.

THERE are ſeveral Stone Bridges in the North of *England* worthy our Remarks and Attention.

THAT at *York* is very remarkable; for the Maſter Arch in the Middle, being eighty-two Feet ſix Inches in the Clear in Width, and twenty-ſeven Foot high, a Segment of a Circle; it is true, the Tides riſe not much above a Yard, or four Feet; but the Floods are very great, as I have ſaid before.

THE two Bridges at *Durham* and *Biſhop-Awkland*, are very large in their Span, being in the Clear near ninety Foot; there are prodigious Floods ſometimes paſs under them.

THE Stone Bridge at *Berwick upon Tweed*, is an admirable Piece of Work, begun by Queen *Elizabeth*, &c.

THE Water is very deep, at low Water 18 Feet, and when the Sea flows in to high Water, it advances 18 Feet more; in all thirty-ſix Feet.

IT is guarded with ſome Sterlings, and the Piers are founded upon Piles of Timber, as Tradition tells them, and it is not improbable. They are alſo of Opinion, that the Water was kept off (during the laying the Foundation) by Coffer-dams.

IF their Account is not miſtaken, there are ſeventeen Arches, the largeſt Arch is eſtimated at upwards of eighty Feet, and ſome others at ſeventy Feet wide, the ſaid Arches ſtill leſſening towards the *Engliſh* Shore.

THERE ſeems to be more Difficulty to erect this Bridge, than to build one croſs the *Thames* at *Weſtminſter*.

THERE is a bold Arch lately built near *Newcaſtle*, for Conveniency of the Coal-trade, which muſt be here mentioned for the Largneſs of its Span, being 120 Feet in the Clear.

THE Bridge at *Blenheim* conſiſts of three Arches, the Principal or Grand Arch ſpans 101 Feet and half, and the other on each ſide 30 Feet.

THE North of *England* was notably ſtored with many magnificent Caſtles, Churches, Stone Bridges, and other publick Buildings. And ſo was *Scotland* the ſame; for they are plentifully ſupply'd with excellent Free-ſtone, and good Artiſts, as may be ſeen in the two principal Cities, *Edinburgh* and *Glaſgow*, where are many Fabricks worth Attention.

BUT to finiſh what we have drawn to ſuch a Length, we ſhall only mention the Stone-Bridge at *Glaſgow*, conſiſting of ſeveral larger and ſome leſſer Arches over the River *Clyd*; the largeſt Arch is in the Middle, and all the other Arches diminiſhing gradually towards each Shore, makes an eaſy Acceſs to that beautiful City.

THERE is a Stone Bridge at *Aberdeen*, very well worth our taking notice of; it has an Arch of near eighty Feet, and ſo high, that a conſiderable Veſſel may ſail through.

WHAT General *Wade* has cauſed to be done in the inacceſſable *Highlands*, muſt be ever remembered to his Honour; the Highways he has made, the Bridges he has erected, the Rocks removed, and Moraſſes dried up, performed by his Soldiers and other Workmen, ſhews an ancient *Roman* Spirit, and merits the moſt exalted Applauſe.

THUS much may ſuffice for our preſent purpoſe. The Benefits of ſuch publick Buildings as Bridges, are as well known as the Neceſſity of them: Where they are magnificent and commodious, the Honour and Advantage of them equally redound to the Publick

BUT where the Structure of them is not ſo beautiful and expenſive, it will be at leaſt required, that it be convenient, ſafe, and durable.

APPENDIX.

IN regard to the Situation of this new intended Bridge, I have added a Plan of the City of *Weſtminſter* from *Charing Croſs* to the *Horſe-Ferry*, by which the ſeveral Places that have been mentioned will be underſtood.

AND it will be obvious to every judicious Perſon, which Place will be moſt convenient, and which moſt inconvenient for the Situation; as alſo at which of the Places it may be practicable, and where it will be impoſſible to erect a Bridge.

I WAS thinking to recommend touching the Place; but upon ſecond Conſideration, I think it better manners only ſhew the ſeveral Places, and leave it to the Publick to pleaſe themſelves in the choice of the Situation, and to the great Wiſdom of the Legiſlature to order it as they ſhall think moſt convenient, for the Benefit, Safety, and Duration of the intended Bridge.

See the following Plan of Weſtminſter.

There having been a SCHEME *for raiſing a Sum of Money to build a* Bridge *with Legs of Stone and Arches turn'd with Bricks, after the Manner of the* Bridge *at* Thoulouſe, *I here ſubjoin what Mr.* Gautier *relates concerning that* Bridge, *after the ſame manner.*

'HE highly commends it, and makes it Six hundred and fifty Feet *Engliſh* in length, conſiſting of five Arches, the largeſt of which he makes One hundred Feet or more in Span; the Piers are four in Number, and are twenty-ſix Feet broad each, and forty-ſix Feet long in the ſquare Parts.

'THE Plinths are made of Stone, as alſo the Quoins of the Arches, and ſome bonding Courſes and Copeings; the reſt being Brick, *viz.* the great Arches, Walls, Butments, *&c.* are built with Brick, and ſtand firm and well.

THE Uſe that may be made of this Example is, that it may be brought into Practice in the new Bridge at *Weſtminſter*, by which means the Expence will be reduced.

IT is therefore humbly obſerved, that the ſame SCHEME (propos'd to be all of Stone) may be done with Brick and Stone intermix'd, and make a very compleat piece of Work, provided the Bricks are made on purpoſe, as they were at St. *Paul*'s, when the Shell of One hundred and ten Feet Diameter was turned.

THE Manner of the Work to be done as follows:

1ſt. THE Plinths are propoſed to be made of Stone to High-water Mark.

2dly. THE Quoins or Archivaults ſhould be Stone.

3dly. THE Cordons or Copeings are propos'd to be of Stone.

4thly. THERE ſhould be ſome Chain-courſes of Stone in the great Arches at ſix or eight Feet aſunder, to bind the Brick-work firmly together, till all ſhall be conſolidated and petrified.

THE reſidue of the Work, *viz.* the great Arches, Walls, and Butments, may be all of Brick-work, with ſome Intermixture of other cheap Materials to fill in.

FINIS.

ERRATA in Page 14.

	Pag.	*Fig.*
There is a Deſign annex'd of this Scheme,	8	2
With the Arch at *York*,	8	2
The *Rialto* at *Venice*,	8	2

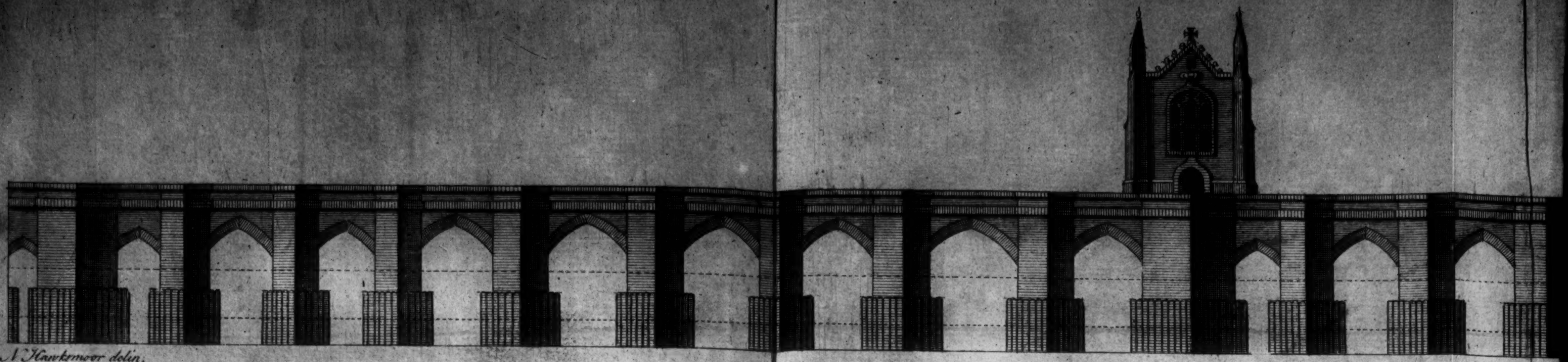
Read, the firſt Plate at the End of the Book.

MVSEVM
BRITAN
NICVM

Juſt Publiſhed,

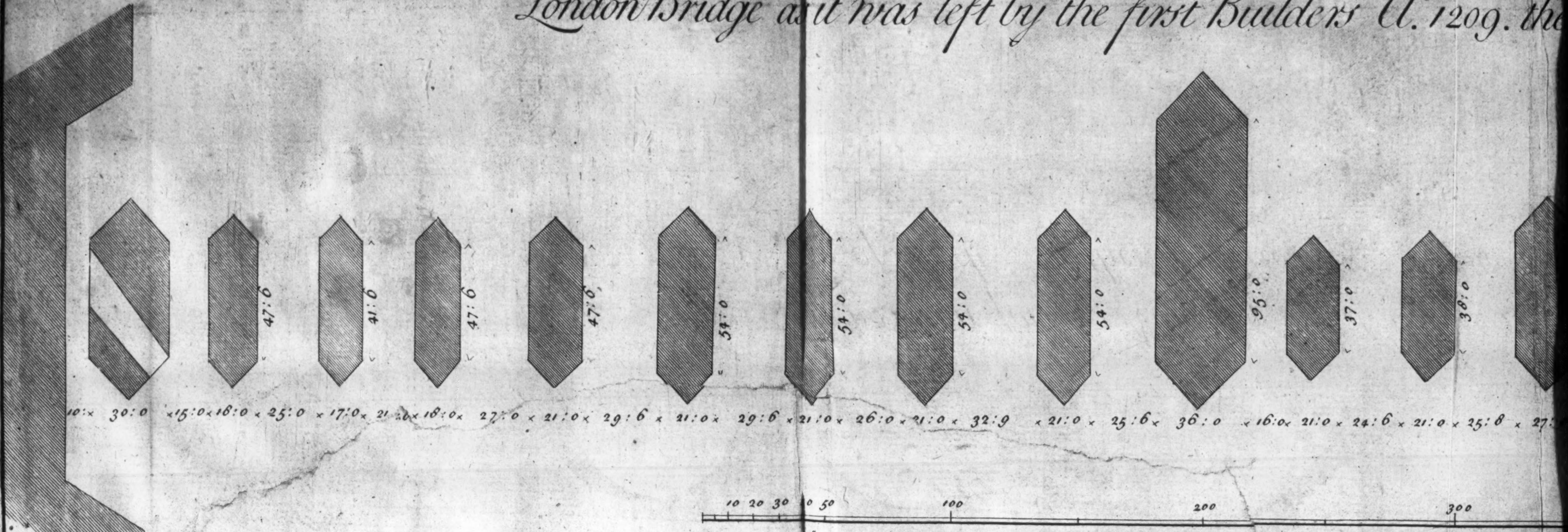
THE Life of *John*, Duke of *Marlborough*, Prince of the *Roman* Empire; Illuſtrated with Maps, Plans of Battles, Sieges, and Medals, and a great Number of original Letters and Papers never before publiſhed. In three Volumes *Octavo*. By *Thomas Lediard*, Gent.

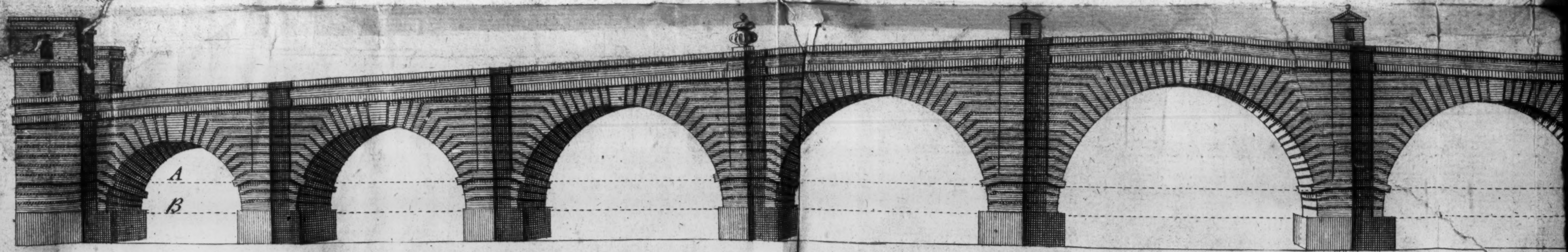
Printed for *J. Wilcox*, at *Virgil*'s Head, againſt the new *Church* in the *Strand*.



N. Hawksmoor delin.

London Bridge as it was left by the first Builders Aº 1209. the

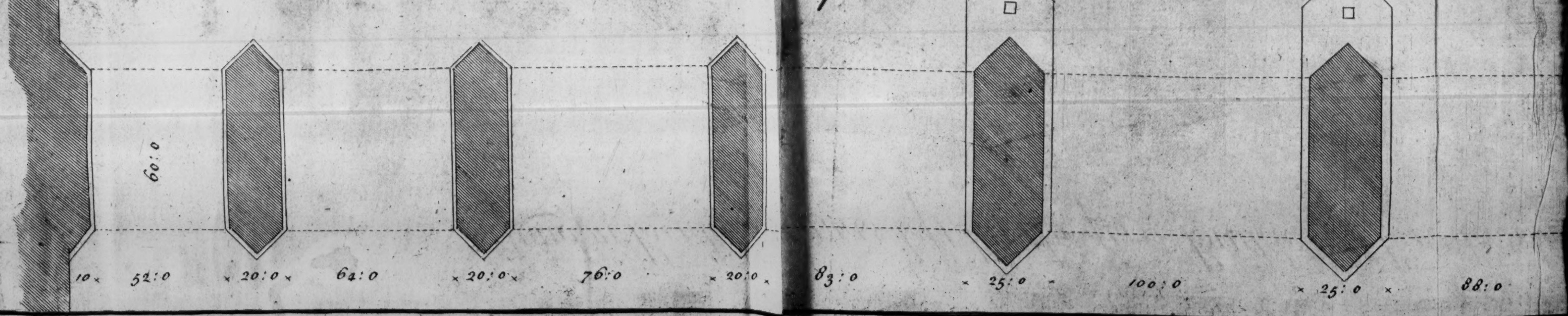


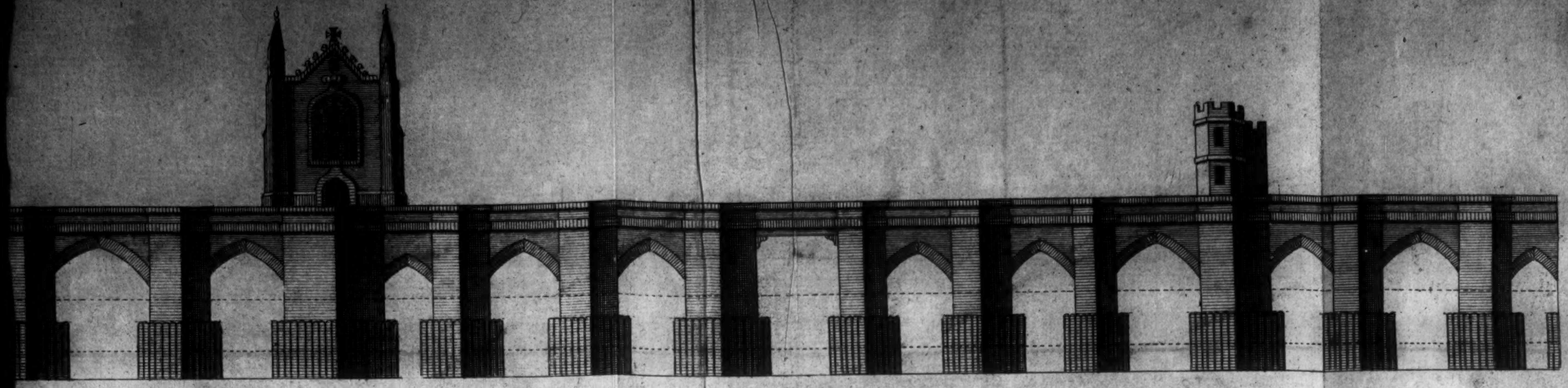


N. Hawksmoor inv.

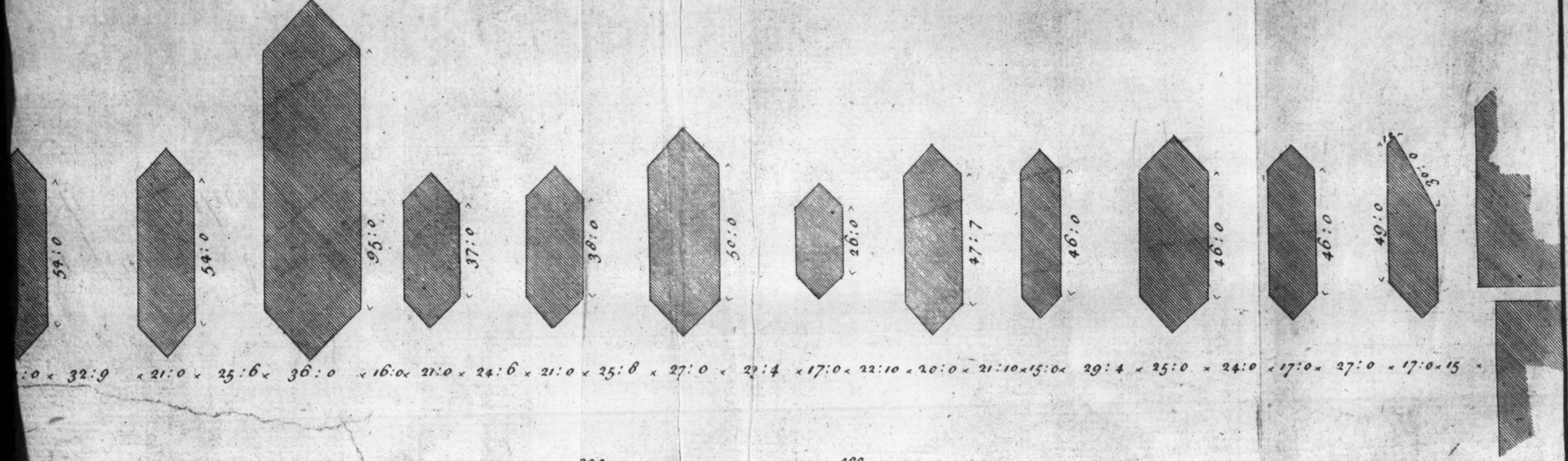
A. High water mark
B. Low water mark

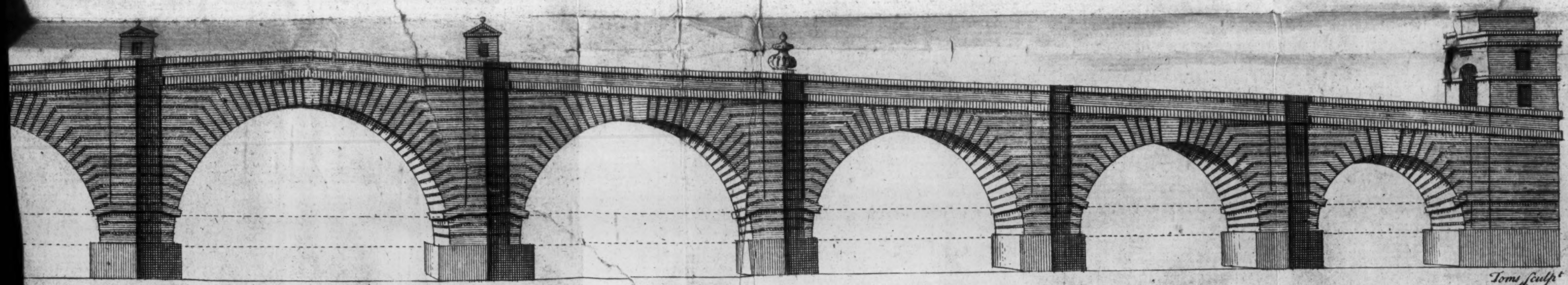
Proposition for a New Bridge at Westminste
of which there is a Modell in Stone





left by the first Builders Aº. 1209. the Sterlings excepted.

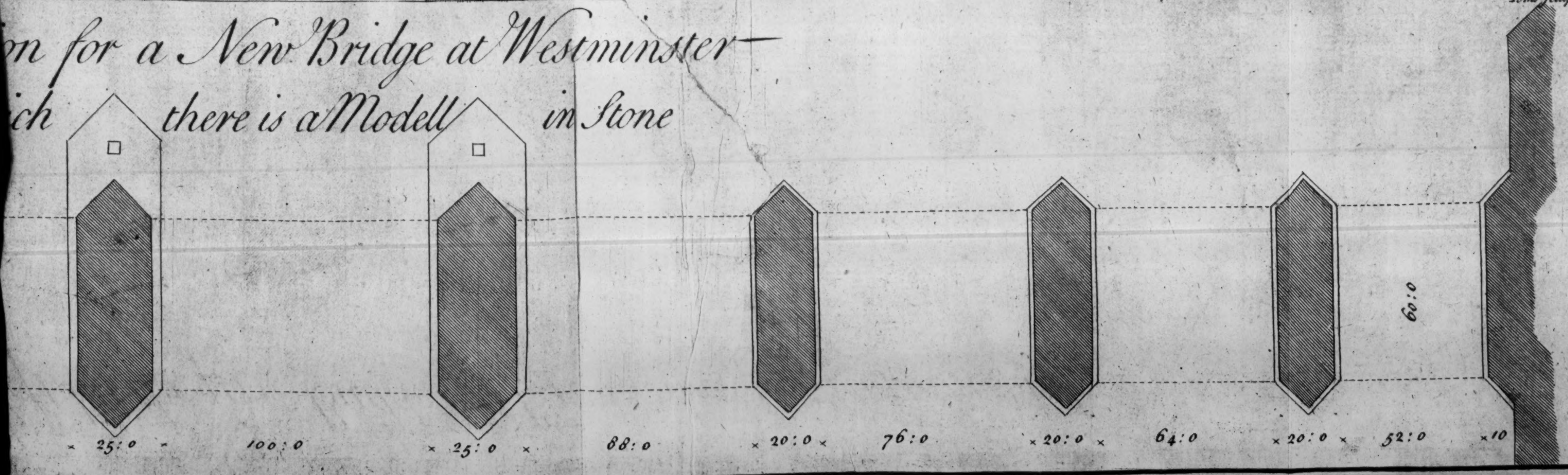




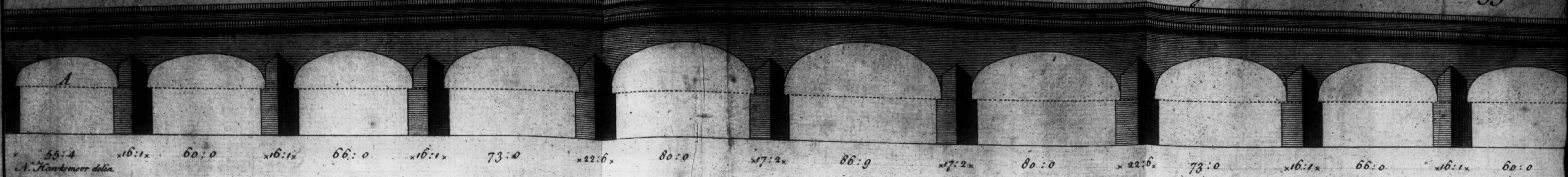
Toms sculpt

on for a New Bridge at Westminster

ich there is a Modell in Stone



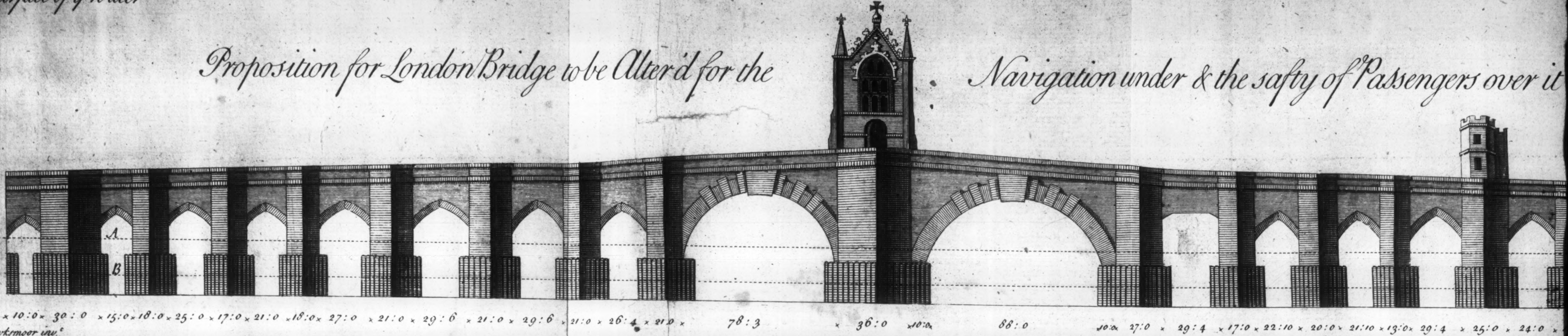
The Bridge at Blois over the Loire is 932 Feet



N. Hawksmoor delin.

A Surface of ÿ water

Proposition for London Bridge to be Alter'd for the Navigation under & the safty of Passengers over it

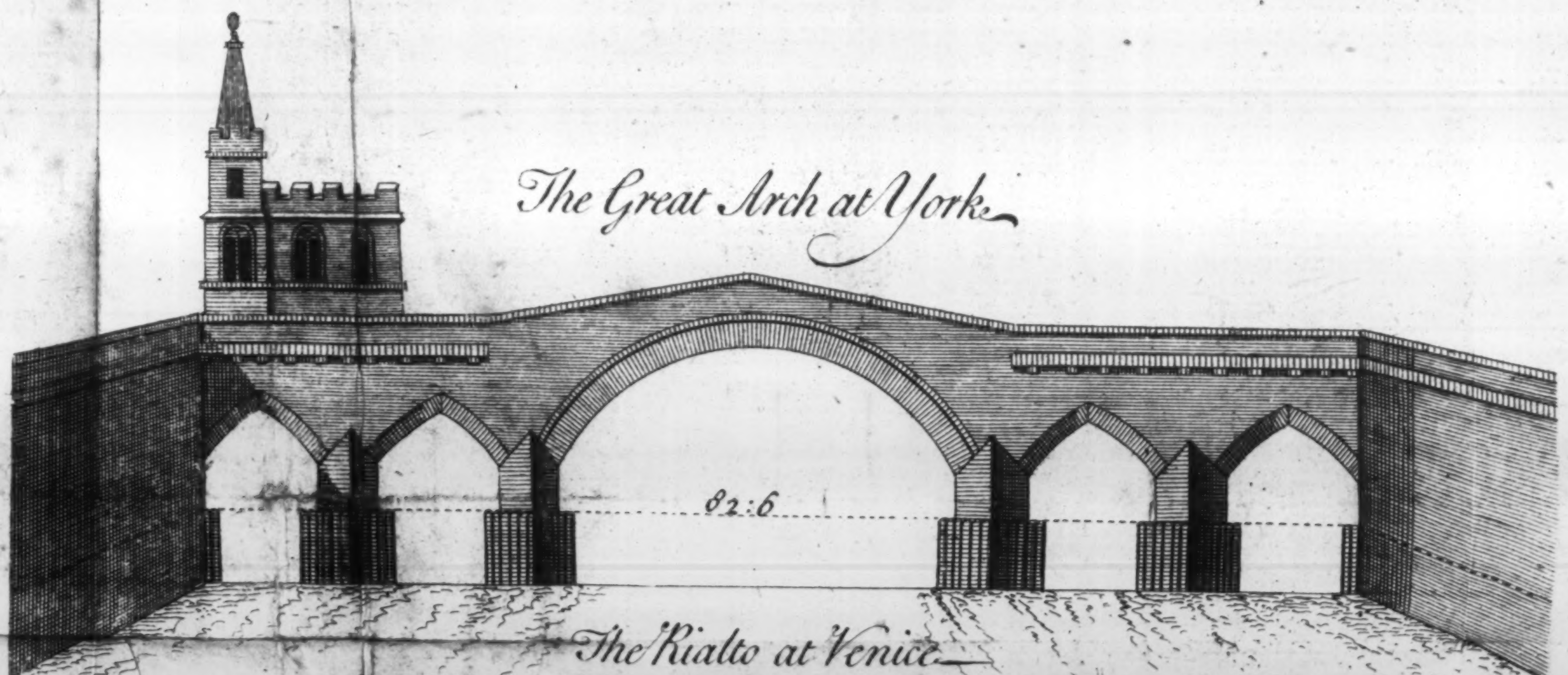


N. Hawksmoor inv.

A High water mark

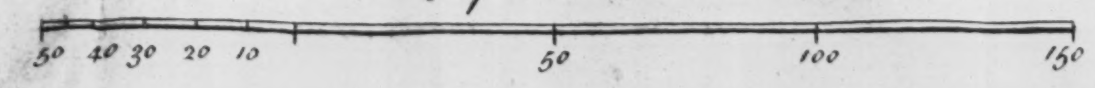
B. Low water mark

The Great Arch at York

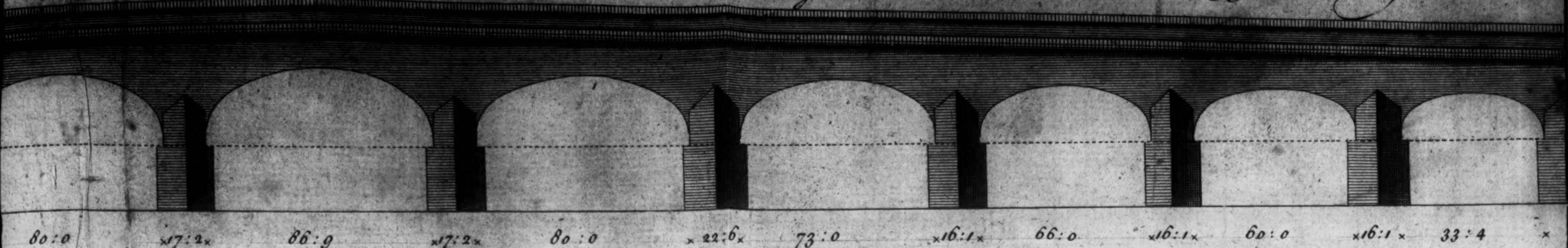


The Rialto at Venice

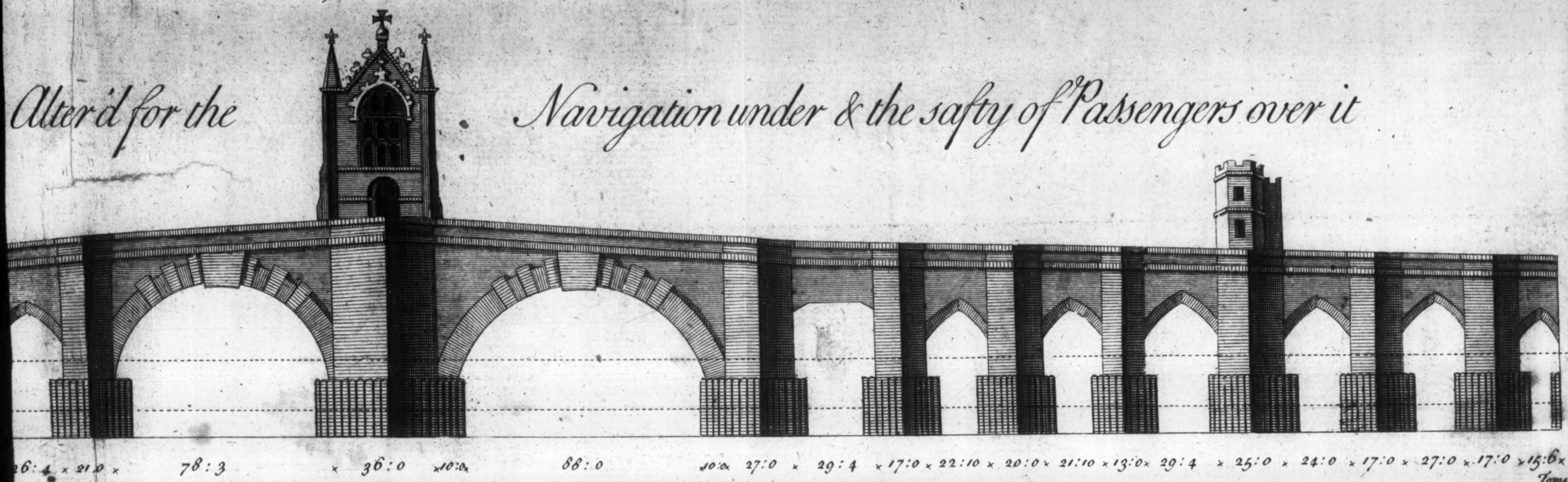
Scale of British Feet



The Bridge at Blois over the Loire is 932 Feet long

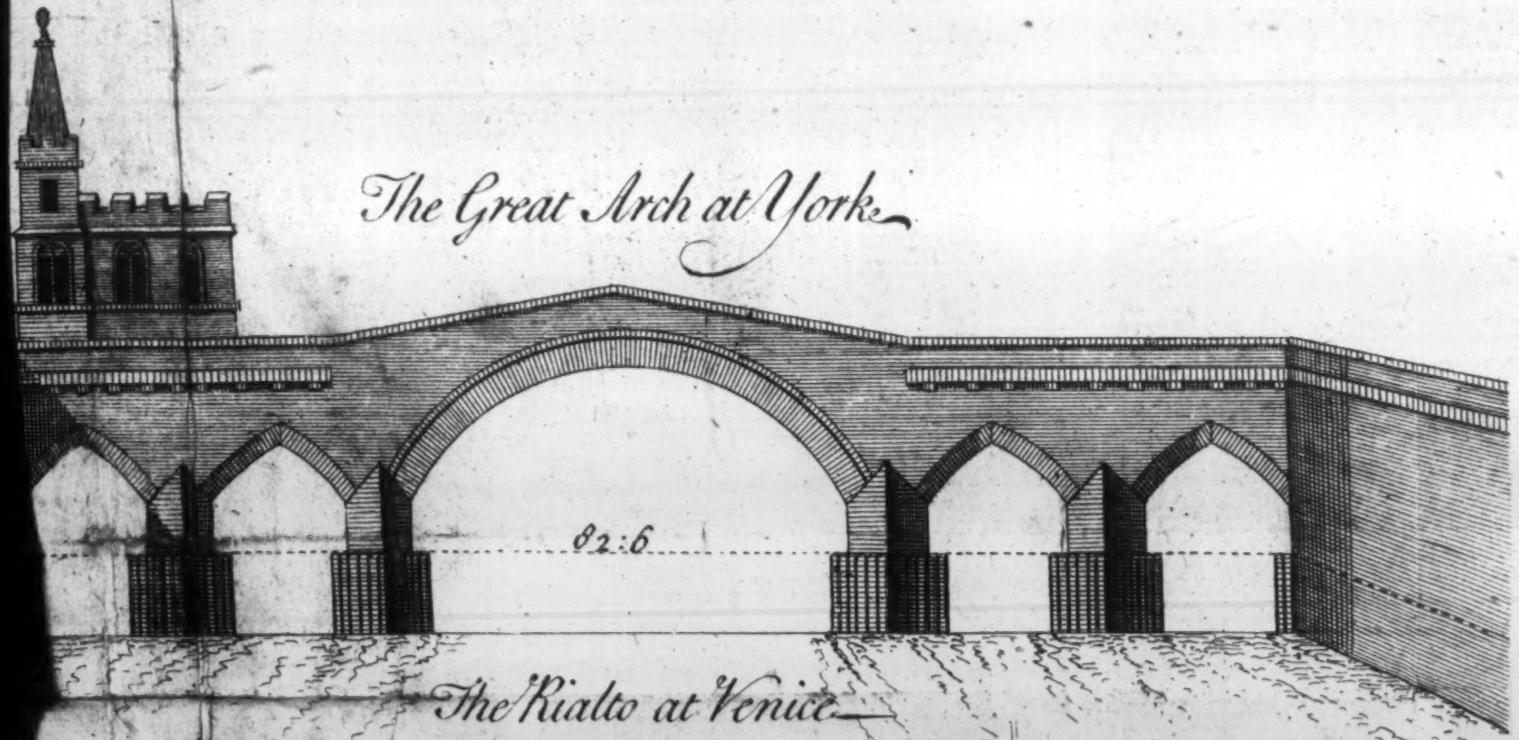


Alter'd for the Navigation under & the safty of Passengers over it

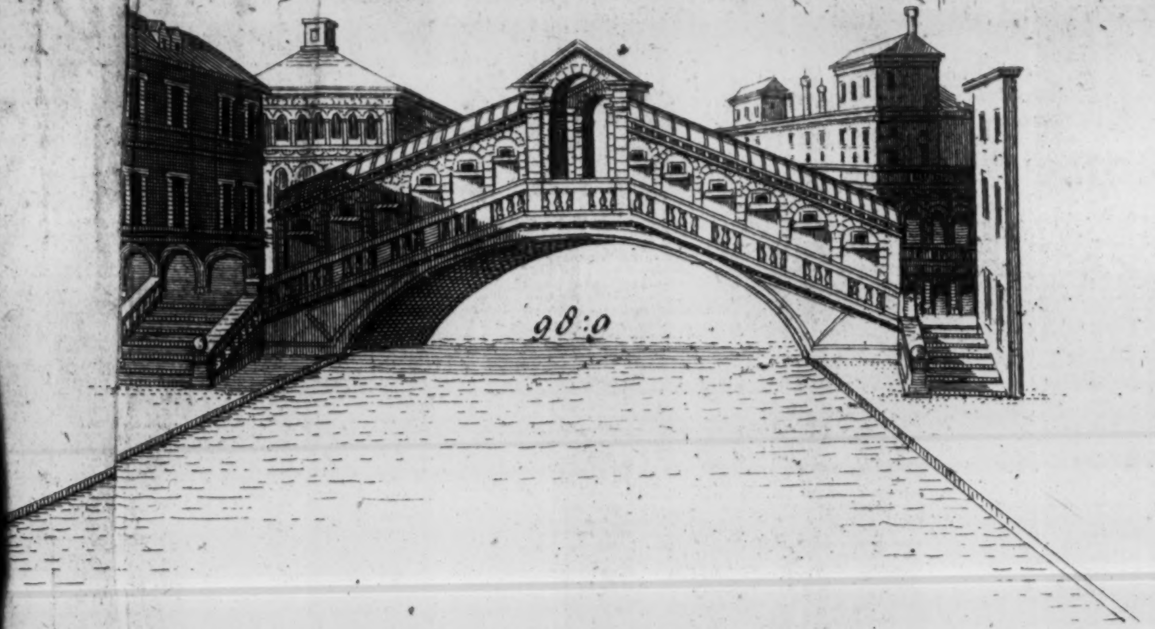


Toms sculp.

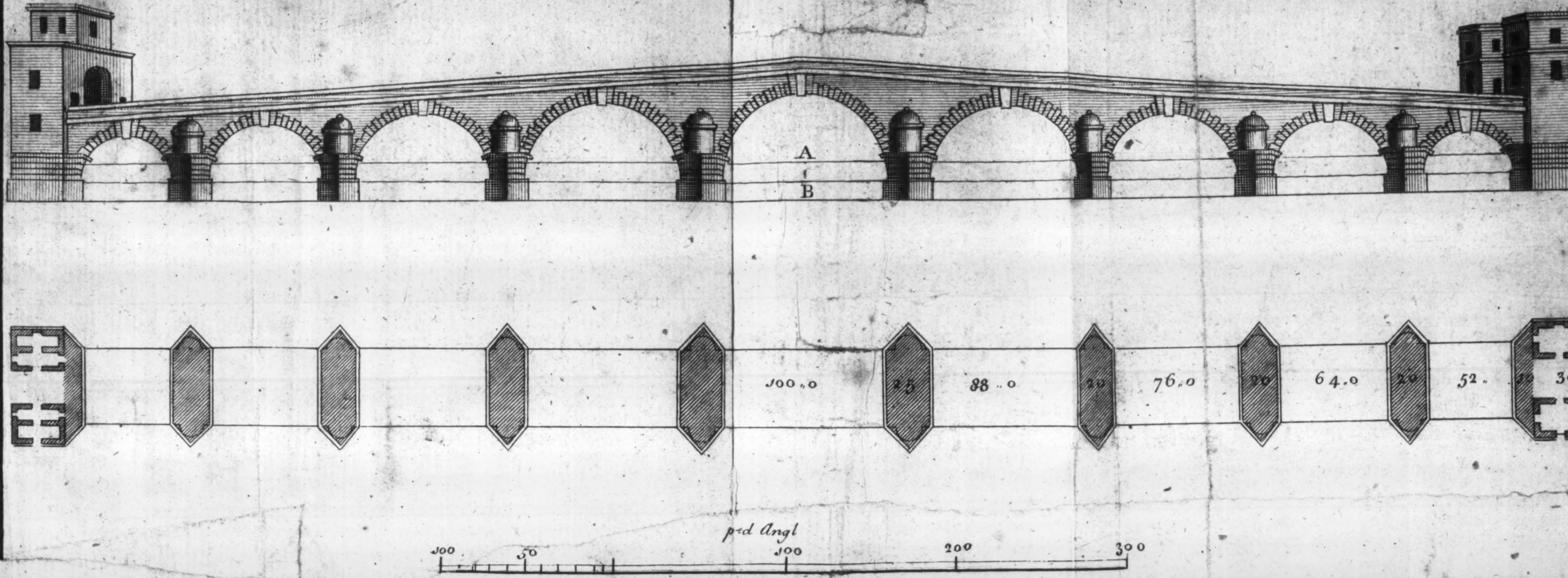
The Great Arch at York



The Rialto at Venice



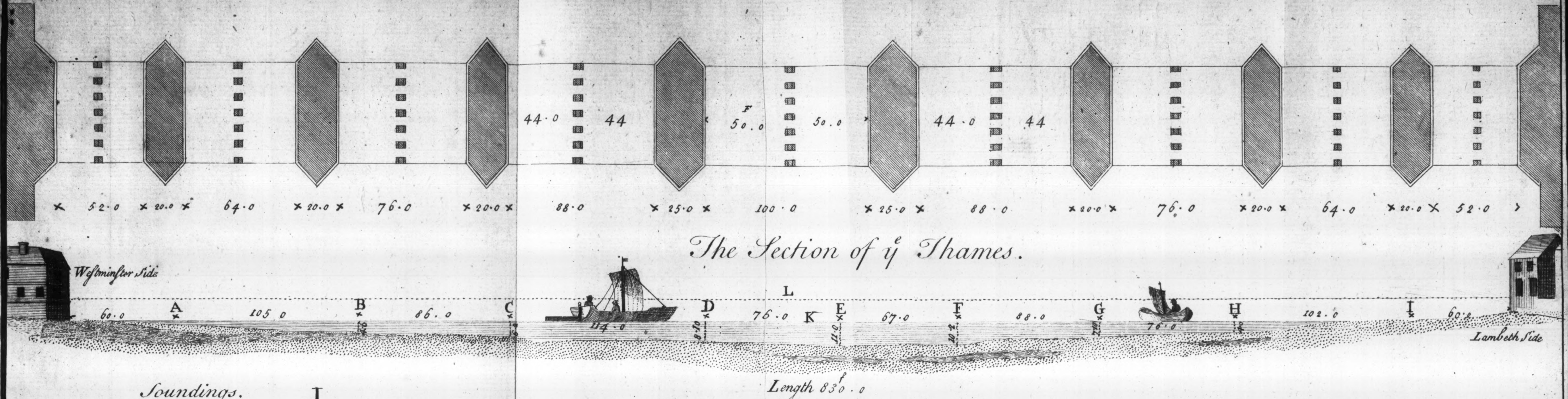
A Propoſition for Erecting a Bridge with Brick & Stone as that is at Toulouse in France.



A High Water. B Low Water.

N: Hawksmoor invt.

B: Cole ſculp.



The Section of y^{e} Thames.

Soundings.

A Low Water Mark, 2^{f} Gravell, 10^{f}, ouse,

B Deep in Water, 4^{f}; Mudd 5^{f}, y^{n} Gravell

C Depth of Water 6:2; Earth 3:6, hard Gravell

D Depth of Water; 8.10; hard Gravell 8:6.

E Depth in Water 11:0; Gravell 4, Clay 4:6

F Depth of y^{e} Water 10^{f}:2 Gravell 4:9, Clay 3:6, Gravell 1^{f}.

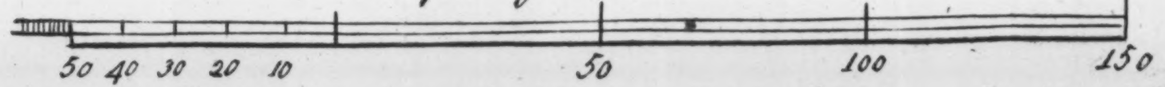
G Depth of y^{e} Water 7:10; Gravell 7. more 8 Deep

H Depth of y^{e} Water 4:0; hard Gravell 4:6, Clay 3. Grarell 3.

I The Low Water Mark; hard Gravell

K Low Water .L High Water.

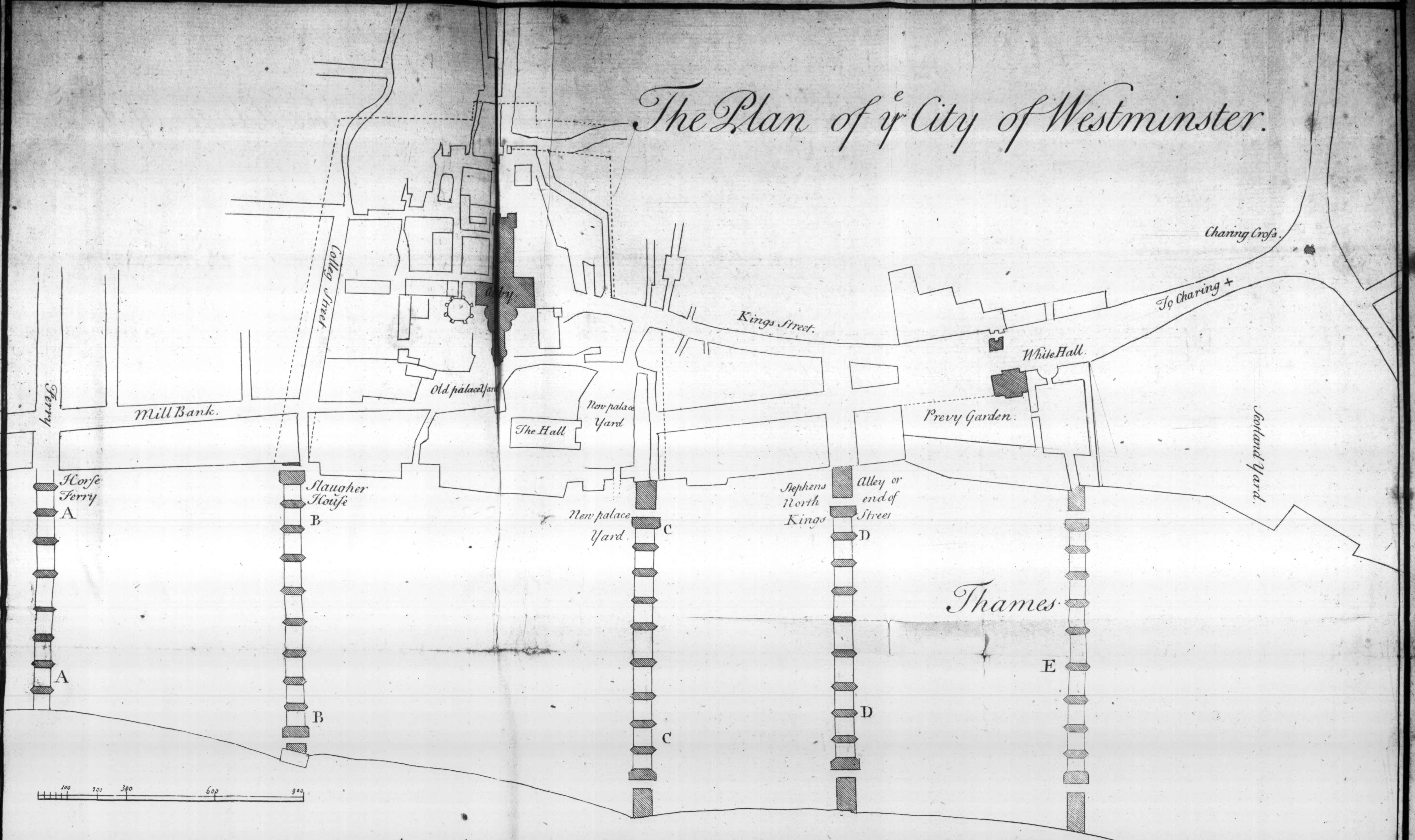
Scale of English Feet



N Hawksmoor Invent

B Cole Sculp

The Plan of ye City of Westminster.



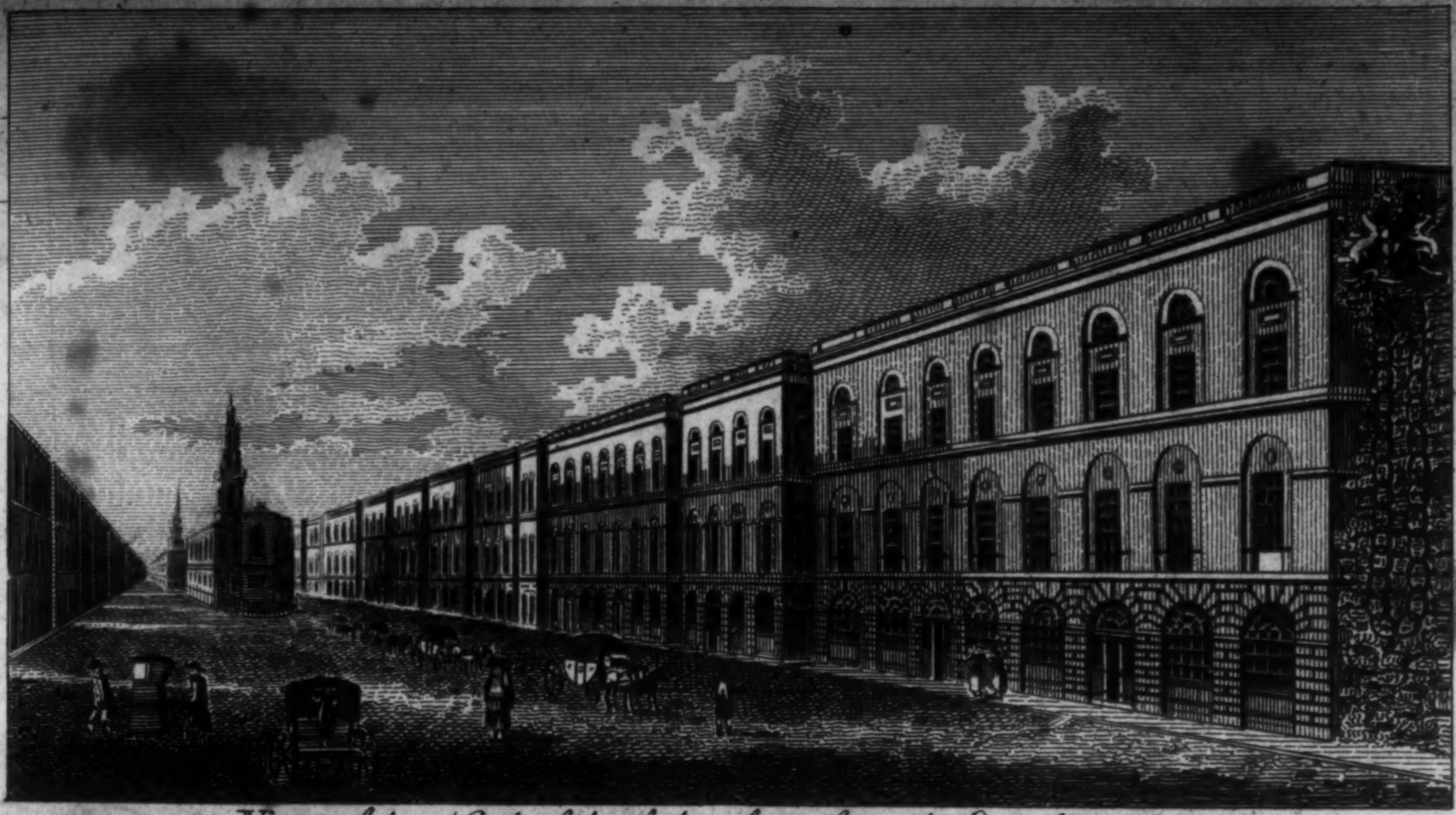
The places following seem ye most proper for placeing a Bridge. Viz.

A The Horse Fery.
C The Woolstaple:
B Colleg Street or ye Slaughter House.
D Stephens Alley but by no means nearer ye bend of ye River.
E Whitehall would do were it not to near ye Elbow of ye River.

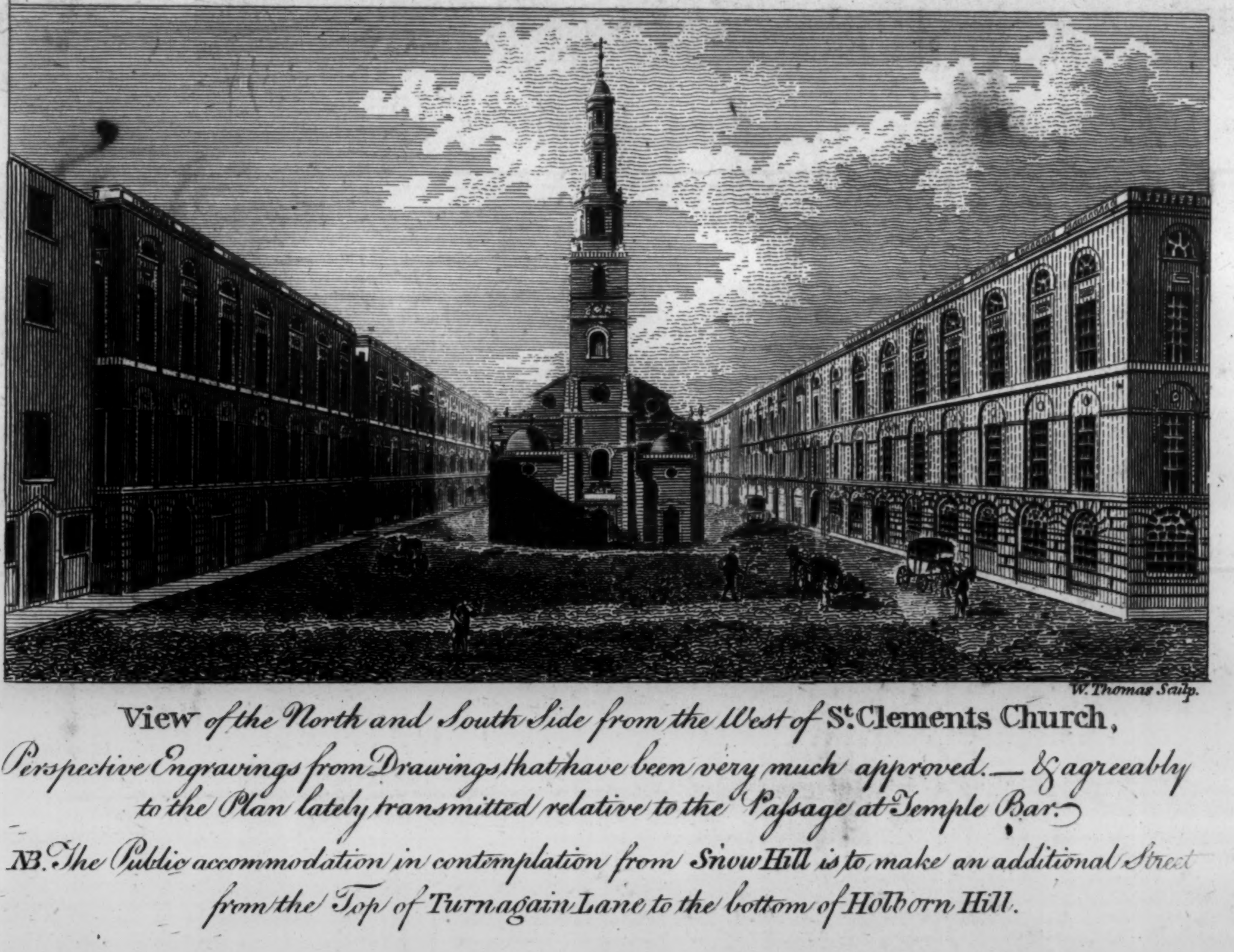
N: Hawksmoor invt.

B. Cole Sculp.

Mr. ALDERMAN PICKETT'S Plans of PUBLIC IMPROVEMENT.



View *of the North Side of the Street from the East of* Temple Bar.



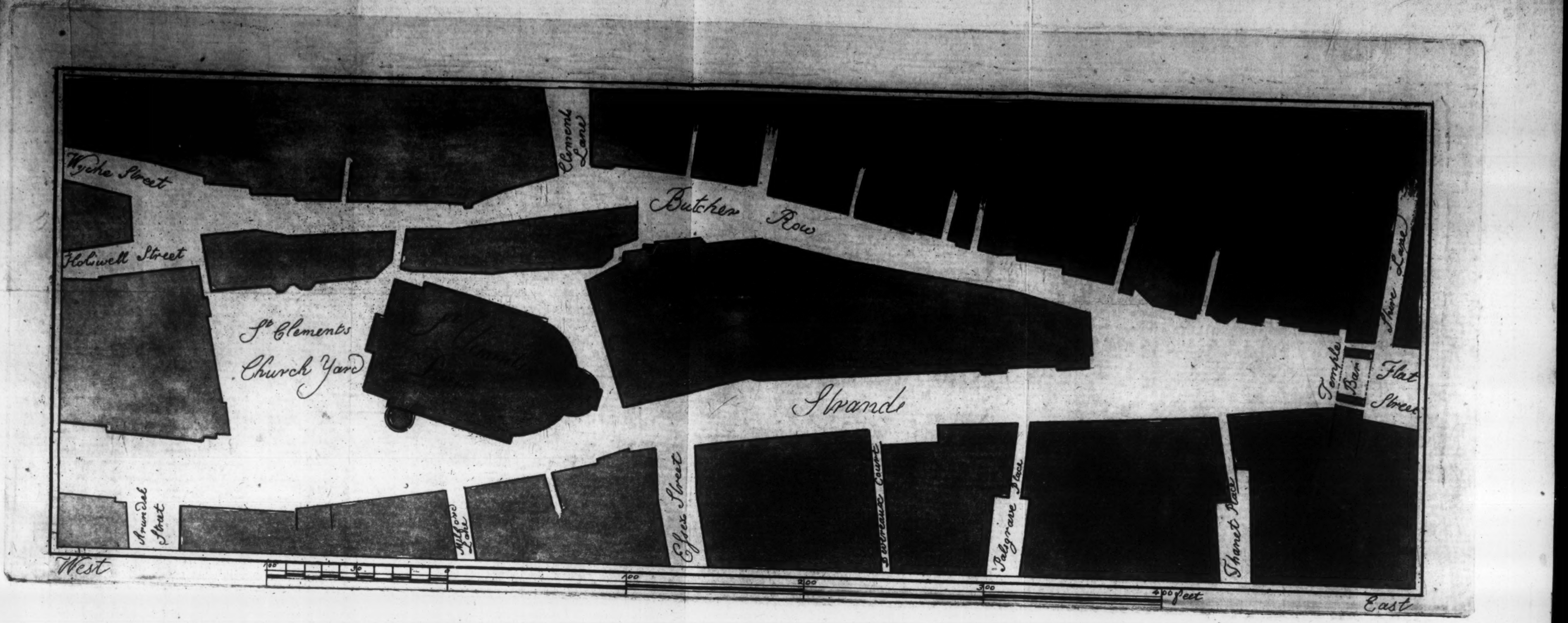
W. Thomas Sculp.

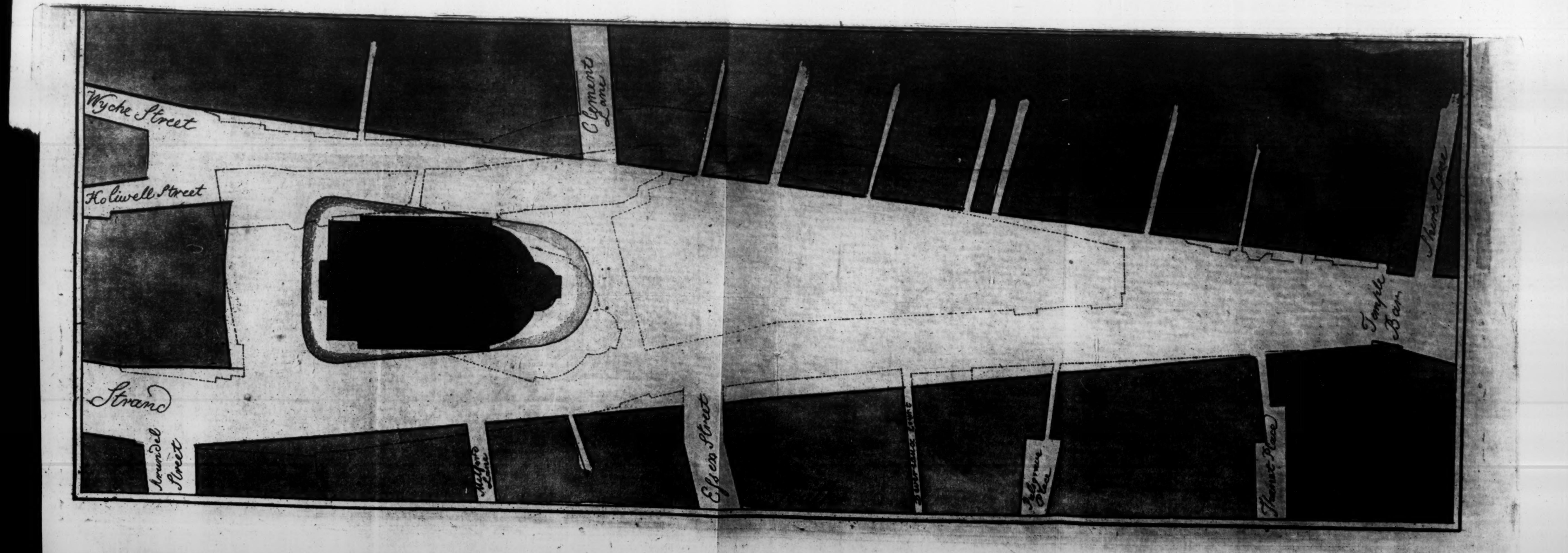
View *of the North and South Side from the West of* St. Clements Church,

Perspective Engravings from Drawings that have been very much approved. — & agreeably to the Plan lately transmitted relative to the Paſsage at Temple Bar.

NB. The Public accommodation in contemplation from Snow Hill *is to make an additional Street from the Top of* Turnagain Lane *to the bottom of* Holborn Hill.

Improvement
of Temple Bar


Wyche Street
Clement Lane
Butcher Row
Holiwell Street
St Clements Church Yard
St Clements Church
Strande
Temple Bar
Shire Lane
Flat Street
Arundel Street
Milford Lane
Essex Street
Devereux Court
Palgrave Place
Thanet Place
West
East
100
50
0
100
200
300
400 Feet


Wyche Street
Clement Lane
Holiwell Street
Strand
Shire Lane
Temple Bar
Arundel Street
Milford Lane
Essex Street
Devereux Court
Palgrave Place
Thanet Place